

JOURNAL of the American Veterinary Medical Association

FORMERLY
AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Assn.)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

TUBERCULOSIS NUMBER

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H. Preston Hoskins, Secretary-Editor, 735 Book Building, Detroit, Mich.

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October, 1924

No. 1

OUR TUBERCULOSIS NUMBER

We have called this issue our Tuberculosis Number, containing, as it does, eight papers on various phases of the subject, from the standardization of tuberculin to the disinfection of tuberculosis-infected premises. These special numbers are popular, evidenced by the fact that our reserve supplies of two special numbers, issued this year—the Educational Number (April) and the Breeding Problems Number (May)—are completely exhausted.

According to a recent number of *Side-Lights on Tuberculosis Eradication*, on May 1, 1924, there were 5753 accredited veterinarians listed by the U. S. Bureau of Animal Industry; 157 county veterinarians were employed in tuberculosis eradication work, with 234 veterinarians employed by the various states, and 206 Bureau veterinarians, making a total of 597 veterinarians on this project almost exclusively. A very significant statement is made in this connection: "*At the present time, practically 10 per cent of the available veterinarians in the United States are devoting their entire energies to tuberculosis work.*"

We believe, therefore, that an issue of the JOURNAL devoted largely to papers on a disease that is uppermost in the minds

of 10 per cent of the profession just now will be warmly received. Several of the papers are technical, but, as we wrote one of the authors, this is no reason for declining to publish such a paper in the JOURNAL. It is our opinion that the publication, in the JOURNAL OF THE A. V. M. A., of valuable contributions of a scientific character, no matter how technical, will reflect credit upon the veterinary profession and add prestige to our JOURNAL as the official organ of a great association of scientific and professional men. Is there one among us who does not cherish a like opinion?

OUR NEW PRESIDENT

It seems almost unnecessary to say anything about our new president. Few veterinarians, if any, have a wider acquaintance than Dr. L. A. Merrillat. His fame as a veterinary practitioner, teacher, author, editor, and soldier is not limited to his own country; it is world-wide. We came near adding that Dr. Merrillat is a farmer, but we understand that Mrs. Merrillat runs the farm, at Orrville, O.

Born at Wooster, Ohio, March 22, 1868, Dr. Merrillat attended the public schools, and was graduated from the Mt. Eaton (Ohio) High School, in 1884. He received his veterinary training at the Ontario Veterinary College, and was graduated with the class of 1888. He is one of hundreds, yes, thousands, who received his inspiration from that grand old teacher, Dr. Andrew Smith. Locating in Chicago, Dr. Merrillat soon built up a very lucrative practice, one of the largest in the world, in fact. He still classifies as a practitioner, although it is stated that he does not answer any night calls, and from another source the information comes that he is very particular and selects his own clients.

As a teacher of veterinary students for almost a quarter of a century, Dr. Merrillat has endeared himself to thousands of veterinarians in the making, passing on to them, unstintedly, the benefits of his rich experiences in the field of active practice. He was Professor of Anatomy and Secretary of the McKillip Veterinary College from 1893 to 1900. The latter year he left to accept the chair of surgery at the Chicago Veterinary College, where he remained until 1913. In that year he rejoined the faculty of the McKillip Veterinary College as Professor of Surgery, remaining until the college closed, in 1919.

Dr. Merrillat made a splendid record in the late war, reaching

the rank of Lieutenant Colonel. He was commissioned from public life, as Major, Oct. 5, 1917, and was made Division Veterinarian of the 41st Division. He was first assigned to Camp Greene, N. C., and a short time later to Camp Mills, N. Y. On December 11, 1917, he sailed for France, arriving December 29. Shortly after his arrival, he was made Chief Veterinarian of the Advance Veterinary Hospital, with headquarters at Neufchateau, where he remained until April 28,



DR. L. A. MERILLAT
President of the American Veterinary Medical Association
1924—1925

1918. He was then made Executive Officer for the Franco-American Veterinary Liaison Mission, Paris, in which capacity he served until Aug. 1, on which date he was made Chief Veterinarian of the First Army, A. E. F., serving until Feb. 23, 1919. For about three months immediately thereafter, he attended l'Ecole Veterinaire Nationale, at Alfort. He left France June 1, 1919, arriving in New York, July 11. He received his honorable

discharge July 25. Shortly afterwards he received word that the French Government had conferred upon him the Legion of Honor.

As an author, Dr. Merillat has produced "Veterinary Surgical Operations," "Principles of Veterinary Surgery," and "Veterinary Dentistry and Stomatology," besides many scientific articles and papers in the field of veterinary medicine and surgery, which have been published in the various veterinary journals. For a number of years he was on the editorial staff of *Veterinary Medicine*, and since the first of the present year has served in a similar capacity with the *North American Veterinarian*.

Dr. Merillat joined the A. V. M. A. in 1893, the meeting that year having been held in the Windy City. He has attended a majority of the meetings which have been held during the past thirty years. In 1896, he was elected a vice-president. Ten years later, at the meeting in Detroit, he was elected to the secretaryship. The following year, at the Kansas City meeting, he turned in 556 new members, of whom 127 were from the state of Illinois. That year Dr. Merillat was unanimously re-elected secretary, only to be called, several months later, into military service, Dr. L. Enos Day finishing the year as acting secretary. For a number of years Dr. Merillat was chairman of the Section on Surgery, of the A. V. M. A., and has served at various times on practically every important committee of the association.

Dr. Merillat is keenly appreciative of the great honor conferred upon him in his election to the presidency of the largest veterinary organization in the world. He is equally aware of the responsibilities which go with that office. As stated by him, when installed in office at the close of the Des Moines meeting, one of his principal aims will be to maintain the harmony in the A. V. M. A. which has characterized its work during recent years. We anticipate that President Merillat will be able not only to maintain the harmony but the progress which the association has shown during the past.

SELECTING VICE-PRESIDENTS

At the Des Moines meeting the statement was made that the present system for electing our vice-presidents is unfair, that "they are elected indiscriminately," and one member inferred that the districts having the greatest number of members

"usurp the authority" of the districts with but few men. Examination of the records of the Association for the past six years fails to bear out this contention—in fact it is absolutely refuted beyond question of a doubt. Here is the evidence:

On the basis of geographical distribution we find that the thirty vice-presidents elected during the past six years are divided as follows:

Canada.....6	South.....4
West.....7	Central.....4
East.....4	Army.....5

The smallest executive board district (Canada) has been honored with one vice-president every year. The Army, with considerably less than one hundred members in the Association, has had a vice-president five times out of six. District number 4 (the South), with the smallest membership of any of the five districts in the United States, has had one vice-president four times out of six. District number 3, with almost 25% of our membership, has had three vice-presidents out of thirty, just 10%.

Let us look at the situation from another angle. How have the various branches of the profession been represented among these thirty vice-presidents? Here are the figures:

Army veterinarians.....	5
College veterinarians.....	6
Laboratory men.....	1
Practitioners.....	11
Regulatory officials.....	7

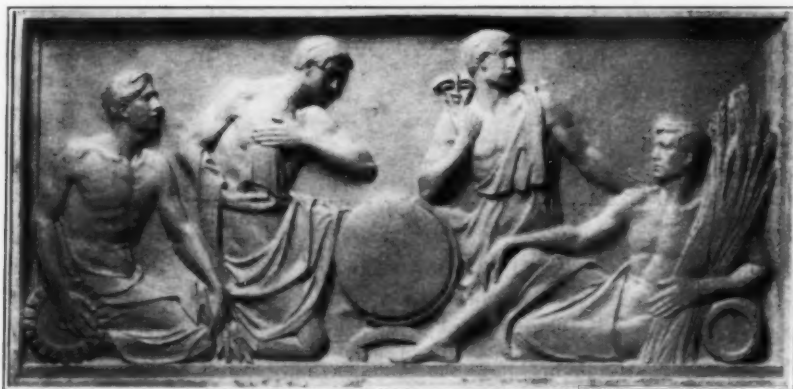
We believe this list spikes another criticism—that any particular group were having things all their own way. Reiterating a statement made by Chairman Way, at the recent meeting, "the selection of vice-presidents of this association is just as democratic in its present form as is the selection of president."

Why not let "well enough" alone?

DESERVED RECOGNITION

The accompanying photograph has been received from Dean Stange, of Iowa State College, and shows one of the panels which has been carved in the front of the new library building at Ames. Dean Stange advises us that the carving was done by Miss Nellie V. Walker, sculptor, of Chicago. The figures in the panel represent Engineering, Science, Veterinary Medicine

and Agriculture. It is believed that this is the first instance in which veterinary medicine has received such substantial and permanent recognition. It is certainly without question the first instance in which the official emblem of the American veterinary profession has been carved into stone in the face of



Panel—Library Building—Iowa State College

a public building. President Pearson was active in securing this recognition for the veterinary profession and we join the veterinary faculty of Iowa State College in thanking President Pearson for his splendid efforts and support in securing this recognition for our profession.

IOWA PASSES ILLINOIS

For a number of years Illinois has enjoyed the distinction of having the largest membership, of any of the states, in the American Veterinary Medical Association. Iowa has wrested this honor away from Illinois. By adding 95 new members at the Des Moines meeting, while Illinois contributed an even half-dozen, Iowa slipped into front place with a comfortable margin of 31 to spare. The exact count for the two states, on August 30, 1924, was:

Iowa	344
Illinois	313

Ever since the Columbus meeting, in 1920, Ohio has occupied third place, in the membership standing, by states, with New York fourth. The report of the Secretary for 1923-24 shows

these positions also reversed, with the Empire State in third place, and the Buckeye State fourth.

An interesting fact shown in the report, is that we have more members in the territory of Hawaii than we have in either the state of Rhode Island or the state of Arizona.

MICHIGAN LAW UPHELD

Judge DeWitt H. Merriam, in a recent decision handed down in the Circuit Court, Detroit, Mich., refused to quash a warrant against a Michigan farmer who had refused, about a year ago, to allow his cattle to be tuberculin tested by the State Veterinarian, under the provisions of Public Act 181. The attorney employed by the farmer filed a motion to have the warrant quashed, on the ground that the law was unconstitutional. In his decision Judge Merriam said:

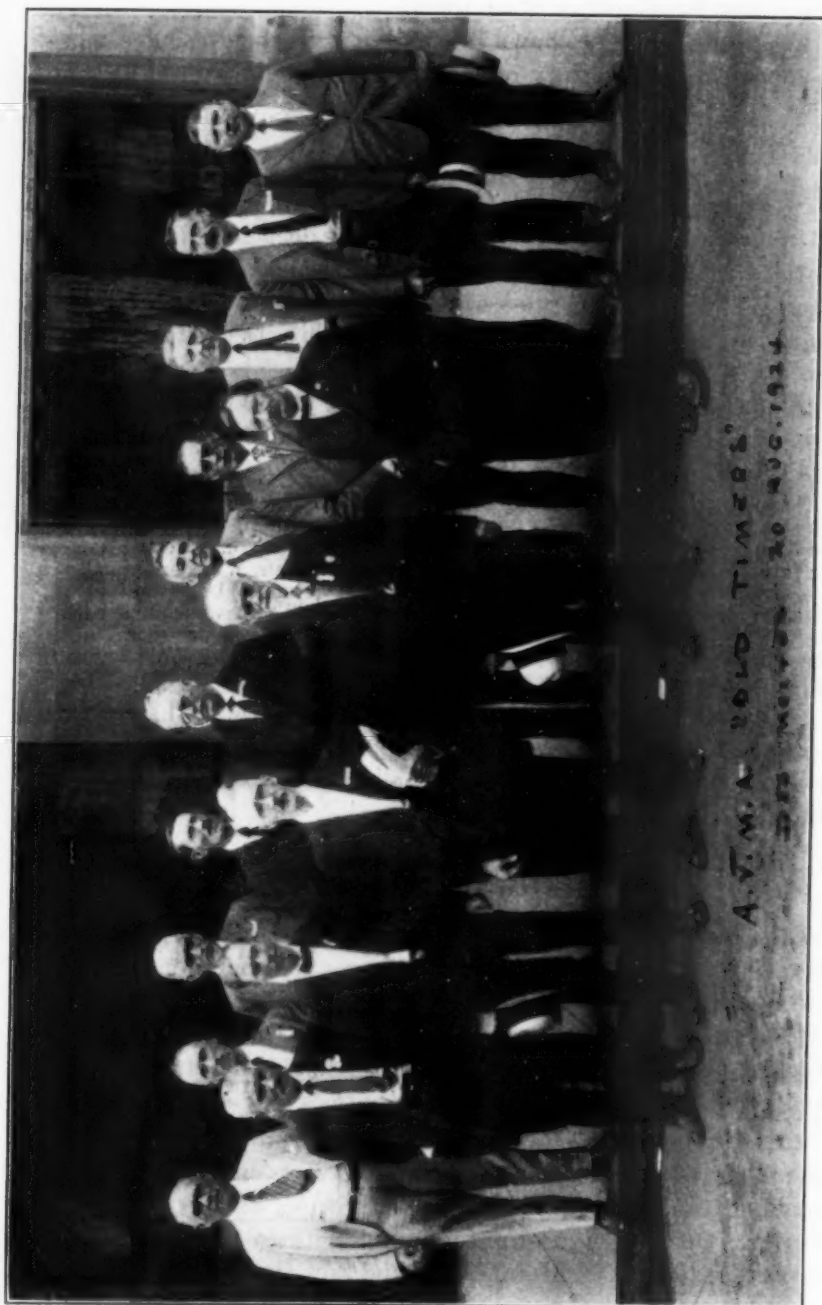
"Administrative officials must on occasion perform duties which affect private property and its possession. It is the abuse of their authority which first concerns the court. Entries upon private property or investigations of private property are constantly being made to determine whether animals are diseased, whether articles of food carry disease germs and are unfit to use, whether elevators, boilers and stairways are safe. All this is done under legislative warrant and without judicial warrant. If judicial process were required in each case, it is clear that the state agencies created to safeguard the health of the people could not function."

Sixty-nine other farmers, in the same neighborhood, had refused to have their herds tested until the outcome of the above case was decided. They probably are all on the waiting list by this time.

HAVE YOU PAID YOUR DUES?

The dues for the new year are being received at a rate that is very gratifying. This year, with the convention coming a week earlier than in 1923, the statements were mailed out about ten days earlier than last year. The task was completed August 5, but before the last lot was placed in the mail, we began to receive remittances in response to the first notices sent out.

As this paragraph is being written a count shows that 1391 members have paid their dues and have been sent their 1924 membership cards. This is a good showing, but could be much better. One of the most encouraging features of the Secretary's report, read at Des Moines, was the fact that we had 21 more paid-up members this year than last, although the number of members actually on the roll was almost 200 less.



A. V. M. A. "Old Timers"—Des Moines, Iowa—August 20, 1924.

To those who have not yet remitted for their 1924 dues, a statement for which was mailed two months ago, kindly consider this reminder as a *second* notice. Send a check before you forget it.

Do it now!

OLD TIMERS AT DES MOINES

Among those in attendance at the recent meeting in Des Moines were fifteen members who were present at the first meeting in Des Moines, in 1895. These "old timers" got together during the meeting and had a photograph taken, which is reproduced on the opposite page. Get out your August JOURNAL and compare this picture with the photograph, on page 554, taken twenty-nine years ago.

In connection with the 1895 picture, since its publication in the August issue, we have received a letter from Dr. Hal C. Simpson, of Pomona, Calif., in which he officially denies that he is Number 1 in the back row. Dr. Simpson informs us that it may be Dr. J. G. Parslow, then of Shenandoah, Iowa, now of Monrovia, Calif. Who can verify this? Also, Dr. E. Brainerd, of Memphis, Mo., acknowledges being Number 12 in the back row of the 1895 group. This still leaves several unidentified.

Those in the 1924 picture are:

Back row (left to right): Wm. Henry Kelly, Albany, N. Y.; J. H. McLeod, Maquoketa, Iowa; L. N. Shipley, Sheldon, Iowa; M. H. Reynolds, St. Paul, Minn.; J. I. Gibson, South St. Joseph, Mo.; N. S. Mayo, Chicago, Ill.; H. L. Stewart, Chariton, Iowa; E. Brainerd, Memphis, Mo.; S. K. Hazlet, Oelwein, Iowa; and A. T. Peters, Peoria, Ill.

Front row (left to right): G. A. Johnson, Kansas City, Kans.; T. A. Scott, Waterloo, Iowa; A. H. Baker, Chicago, Ill.; S. Brenton, Detroit, Mich.; and C. A. Cary, Auburn, Ala.

MAKE YOUR OWN DIAGNOSIS

The following news item recently appeared in a paper published in one of the southern states:

"The first caponizing in County recently was done by County Agent R. H. King. A total of 130 birds were operated upon without a single death, which is a rather remarkable feat. The inauguration of this work by Mr. King has caused a number of farmers to realize the possibilities of raising capons, which often sell for as much as turkeys. One of the veterinarians in the county now is convinced of the value of the work, and is offering his services."

We believe any comment we might make would be superfluous.

It sounds like an old story.

OHIO HAS THE RIGHT IDEA

Following several outbreaks of hog cholera, believed to be due to the improper use of anti-hog cholera serum and virus by inexperienced individuals, Hon. Charles W. Truax, Director of Agriculture of the State of Ohio, is reported to have under consideration an order restricting the use of these products.

It is proposed to require companies manufacturing serum and virus to secure permits to ship these products, and in no case to ship them to persons not authorized to administer serum and virus. All veterinarians will be automatically so authorized.

Director Truax has also announced an innovation in connection with tuberculin testing, which is designed to speed up the work of tuberculosis eradication in Ohio. The plan involves the employment of local accredited veterinarians in counties where area work is under way.

The work was started July 14, 1924, with Dr. A. I. Wolf, of Bolivar, giving four days a week to the work. Dr. Wolf is to work on a per diem basis, and will receive his remuneration from the county organization backing the work. At this writing, eight accredited veterinarians are at work, according to information received from the State Veterinarian, Dr. F. A. Zimmer. All rules of both federal and state departments will be strictly adhered to.

If the plan works out satisfactorily, other local veterinarians will undoubtedly be employed on the same basis, thereby solving one of the difficulties that have stood in the way of solving the big problem. Sentiment in Ohio is at the right pitch for adopting any plan that will expedite the work and hasten its completion.

IMPORTANT NOTICE

At the recent meeting in Des Moines, a number of amendments to the by-laws were adopted, including the proposed amendment changing the manner in which applications for membership will be handled in the future. Section 6 of Article 2—Application for Membership—now reads as follows:

Applications for membership shall be made upon blanks furnished by the Association, in the handwriting of the applicant, and must be endorsed by two members of the Association in good standing, one of whom must be a resident of the state, province, or territory in which the applicant resides. Applications must be accompanied by the membership fee of \$5.00 and dues pro rata for the balance of the fiscal year current, as stated on the application blank. Applications must be filed with the Secretary and

be examined by him for correctness and completeness as far as available information will allow. After such approval by the Secretary, the latter will cause to be published in the official JOURNAL, as soon thereafter as possible, said application with name and address of applicant, college, and year of graduation, and names of vouchers. If no objections shall be filed with the Secretary, as against the applicant being admitted to membership in the Association, his name shall again be listed in the next issue of the JOURNAL, and if no objections shall have been filed within thirty days after the second publication of the name of the applicant, he shall automatically become a member and shall be so enrolled by the Secretary, and membership card issued. If any objections be filed against any applicant, either on first or second notice, said application will be referred to the Executive Board for consideration.

The new system is being put into operation this month, and we are giving the first listing to seven applications, received since the Des Moines meeting. The applicants are graduates of recognized colleges, properly vouched for, and the proper fees accompanied the applications. Read over the following list, and consider it your duty, if you know of any reason why any of the applicants would not make a good member of the A. V. M. A., to file your objections with the Secretary, in writing, without delay.

- Bryson, Garland A. 1525 Pierre Ave., Shreveport, La.
V. M. D. Indiana Veterinary College, 1924
Vouchers: Harry Morris and W. H. Dalrymple.
- Dockstader, W. L. St. Ansgar, Iowa
M. D. C. Chicago Veterinary College, 1910
Vouchers: H. N. Strader and L. E. Foster.
- Donnelly, J. Fergus Campbellton, N. B.
V. S. Ontario Veterinary College, 1907
Vouchers: J. H. Shonyo and J. T. Melanson.
- Heagle, Clyde J. Seymour, Wis.
D. V. M. Chicago Veterinary College, 1917
Vouchers: E. L. Quitman and V. S. Larson.
- Johnson, W. T. Western Washington Exp. Station, Puyallup, Wash.
B. S. Washington State College
D. V. M. Washington State College, 1917
Vouchers: J. W. Kalkus and Carl Cozier.
- Killian, Fintan O. 6763 Chamberlain Ave., St. Louis, Mo.
D. V. M. Kansas State Agricultural College, 1921
Vouchers: Ralph Graham and H. A. Wilson.
- Mattson, W. H. Chester Heights, Pa.
V. M. D. University of Pennsylvania, 1889
Vouchers: W. S. Gimper and T. E. Munce.

COMING VETERINARY MEETINGS

New York City, Veterinary Medical Association of. Academy of Medicine. 17 W. 43rd St., New York, N. Y. October 1, 1924. Dr. C. G. Rohrer, Secretary, 40 W. 61st St., New York, N. Y.

- Eastern Iowa Veterinary Medical Association. Cedar Rapids, Iowa, Oct. 1-2, 1924. Dr. F. J. Crow, Sec., Iowa City, Iowa.
- Mississippi Valley Division, Nat. Asso. B. A. I. Veterinarians. St. Louis, Mo. October 4, 1924. Dr. G. H. Bruns, Sec., 1216 N. 18th St., East St. Louis, Ill.
- American Humane Association. Toronto, Ont., Canada. October 6-11, 1924.
- Michigan (Southeastern) Veterinary Medical Association. Detroit, Mich. October 15, 1924. Dr. H. Preston Hoskins, Sec.-Treas., 735 Book Bldg., Detroit, Mich.
- American Public Health Association. Statler Hotel, Detroit, Mich., Oct. 20-23, 1924.
- Louisiana Veterinary Medical Association. Alumni Hall, State University, Baton Rouge, Oct. 22-23, 1924. Dr. L. H. Bennett, Sec.-Treas., Monroe, La.
- Massachusetts Veterinary Association. American House, Boston, Mass. Oct. 29, 1924. H. W. Jakeman, Secretary, 44 Bromfield St., Boston, Mass.
- Michigan-Ohio Veterinary Medical Association. Monroe, Mich. Oct. 30, 1924. Dr. W. E. Watson, Sec.-Treas., Metamora, Ohio.
- Southeastern States Veterinary Medical Association. Murphy Hotel, Richmond, Va. November 10-11, 1924. Dr. Jno. I. Handley, Sec.-Treas., P. O. Box 1533, Atlanta, Ga.
- Dixie Veterinary Medical Association. Memphis, Tenn., November 12-13, 1924. Dr. C. C. Brown, Sec., 1157 Union Stock Yards, Memphis, Tenn.
- Illinois State Veterinary Medical Association. Lexington Hotel, Chicago, Ill. Dec. 2-3, 1924. Dr. L. A. Merillat, Secretary, 1827 So. Wabash Ave, Chicago, Ill.
- United States Live Stock Sanitary Association. La Salle Hotel, Chicago, Ill. Dec. 3-4-5, 1924. Dr. O. E. Dyson, Secretary, 923 Live Stock Exchange Bldg., Kansas City, Mo.
- Nebraska State Veterinary Medical Association. Lincoln Hotel, Lincoln, Nebr. December 9-10, 1924. Dr. F. R. Woodring, Sec.-Treas., Lincoln, Nebr.
- South Dakota Veterinary Medical Association. Sioux Falls, S. D. January 28-29, 1925. Dr. C. C. Lipp, Sec.-Treas., Brookings, S. D.

ELIMINATING TUBERCULOSIS FROM BADLY INFECTED HERDS

By R. L. CONKLIN, Macdonald College, Que.

With the increased interest in the "accredited herd" work now being carried out upon this continent, it is desired to eliminate all tuberculous animals as quickly as possible. The owners of herds do not seem to mind being "badly hit" once, but when animals are taken out on each successive test, they begin to question the reliability of both the test and the men applying the test.

A herd of the type in which the infection persists causes great dissatisfaction, not only to the owner but by the possibilities of reinfecting other herds. Animals from badly infected herds, although they may have passed several tests, should be regarded with suspicion. The reading of biological tests is not a "wooden job," but one which involves considerable insight into the physiology of the organism. If this is true, and since no two men view any case from the same angle, what is the probable chance of error in badly infected herds? The average veterinarian, who is doing this class of work, is too prone to think that he is helping the owner's feelings by not removing a suspicious case. He may even go so far as to inform the owner that he expects to get this animal at a subsequent test. Why not follow some of the advertising schemes and "do it now?" Uncertainty and hesitation in dealing with these suspicious cases do not give the profession any credit.

The methods employed in this experiment resulted from the necessity of dealing with herds of the type mentioned. They were herds in which the subcutaneous test had been used repeatedly for years and where there was no doubt that reacting animals had been retained within the herd. It not only gave an opportunity to study late reactors, but also brought out the possibilities of detecting attempts at "plugging" animals by the old subcutaneous method.

The principle upon which the tests were applied centered about the hypersensitization of the individual. To attempt this, the following tests were employed: (a) intradermal, (b) ophthalmic, (c) intrapalpebral, and (d) subcutaneous. Not all of these tests were applied to the same animal, nor was the

same combination of tests employed in all cases. In most cases, after noting the results with large doses of subcutaneous tuberculin, this test was not used.

No attempt will be made in this paper to give a detailed report relative to the reactions, applications of the tests, technic, etc., as every veterinarian should be familiar with such. Certain general points, observed while conducting the work, will be stated. Records of this work from the fall of 1921 to the fall of 1923 are available.

CASE REPORTS

Herd 1: This herd was known to be badly infected from the results of previous tests. When this herd was first tested by the intradermal and ophthalmic tests (after the subcutaneous test had been employed for years), many reactors were discovered. Autopsy revealed a severe infection in all reactors. The triple test had never been used on this herd, and it was employed at the subsequent test.

The results of the triple test above mentioned gave some very peculiar facts. Some of the animals reacted to the subcutaneous test only, and two reacted to the subcutaneous and the ophthalmic test, while four reacted to the ophthalmic test only. These animals were slaughtered, and all gave positive evidence of the disease. The lesions ranged from open lesions to generalized tuberculosis in the case of those animals which had reacted to the ophthalmic test only. The remainder of the cases exhibited localized lesions.

Following this test, the subcutaneous, intradermal, and ophthalmic tests were applied to groups by various methods, the subcutaneous being used first, then the ophthalmic at the completion of the first test, along with the intradermal test. The ophthalmic test was started before the others by placing a sensitizing tablet in the eye twelve hours before giving the injections of the other tuberculins, and a second ophthalmic tablet was used at the end of sixty hours. A third method used consisted of using the intradermal and the ophthalmic, followed in twelve hours by the subcutaneous test.

As the result of these combinations of tests, the following points of interest were noted: (1) When the subcutaneous test was applied at the same time as the intradermal test, the former interfered with the results to be obtained from the intradermal test. This same thing held true when the subcutaneous test

was applied at any time before a definite reaction had been obtained from the intradermal test. (2) The interference noted concerning the intradermal test did not hold true with regard to the ophthalmic test. (3) Many animals which had been tested repeatedly for years would give no reaction to either the subcutaneous test or the intradermal test but did react to the ophthalmic test. These animals were checked at time of slaughter.

Following the above experiences, the following methods were used. The intradermal tuberculin was injected into the subcaudal fold, and a sensitizing ophthalmic tablet was placed into the eye. At the time of the 72-hour reading, a second ophthalmic tablet was placed in the eye. Observations were taken as usual. After five days had elapsed, another sensitizing tablet was placed in the eye, and the intrapalpebral injection was made. After 60 hours, a fourth tablet was placed in the eye and observations taken.

This method, described as the follow-up method, was afterwards used as routine on this farm. In the first test of this nature, an additional 50 per cent of reactors was obtained after the regular test had been completed. This herd, at a second test after the one mentioned, passed a clean test under the accredited herd plan.

Herd 2: Conditions in this herd were similar to those mentioned in herd 1. The first follow-up test was applied after the regular test. It netted six reactors, or 20 per cent over the number which reacted to the regular test. These animals were isolated for 60 days, when they were again tested by the regularly employed veterinarian and reacted. They gave positive evidence of the disease when slaughtered.

Herd 3: In this herd there had been a severe loss of animals in the regular test, and animals were being purchased to replace the numbers lost. Eleven animals were purchased under the certificate of a veterinarian, stating that these animals had been tested just previous to their shipment, and that all had passed a satisfactory test. Upon arrival at the farm, these animals were subjected to the follow-up test, and three of them reacted.

These three animals were isolated for 60 days and tested by another veterinarian. They again reacted and were slaughtered under the supervision of a competent veterinarian. One of these animals exhibited udder lesions, another showed slight pulmonary lesions and lesions of the mediastinal glands, while the third had

lesions of the liver, the retropharyngeal glands, and the bronchial glands.

This herd has now passed two clean tests and is on the way to accreditation.

Herd 4: A single animal had been tested locally for a number of times and three times during the year, preceding the application of the follow-up test. This test was applied after the local tester had applied the intradermal and ophthalmic tests. This animal reacted to the follow-up test, and when slaughtered proved to be a generalized case.

Herd 5: A cow in this herd was slaughtered after having fractured a hip. Upon autopsy, the animal was found to be tuberculous. Since this herd had been tested regularly, and no reactors had been removed recently, a physical examination of the remainder of the herd was made. Two animals were found upon which there were a number of peculiar nodules. Some of these nodules were removed surgically and brought to the laboratory, where the purulent material which was within the center of the nodules was tested. The means of testing this material consisted of making an emulsion of the lesion in normal saline solution. The emulsion was then injected into rabbits. These rabbits gave positive evidence that these lesions were tuberculous.

Having discovered the nature of the skin lesions, these animals were tested, along with two others, by the method mentioned in this paper. One of the animals gave a typical reaction, while the other could have been considered as doubtful. These skin lesions were afterwards removed by surgical procedure. The animals have since passed another local test, but the second follow-up test will be applied to these animals in the near future.

While all of the animals which are mentioned as reacting to this test have not been slaughtered, a sufficient number have been viewed at autopsy to bring out the possibilities of this type of testing. In the cases of the herds quoted, it has shown the uncertainty of the intradermal test when employed at the same time as the subcutaneous test. It has also shown us that the return test by small injections of tuberculin may be employed soon after a regular test with good results in the process of eliminating tuberculosis from badly infected herds. It may also be observed that the ophthalmic test was not affected by either of the two other tests, and further that the following up

of these suspicious cases tended to intensify the reactions. This was shown by animals which had reacted to the regular test.

Animals in which "plugging" is suspected may be tested in this manner with surprising results to both the veterinarian and the one who has attempted the "plugging."

While this method has not been generally employed, it has been used on some few hundred animals with the results mentioned. Further study of the method is recommended with the view of a quick method of cleaning up these badly infected herds.

BUREAU TRANSFERS

Dr. Henry J. Boyer (Ind. '14), from Indianapolis, Ind., to Anderson, Ind., on meat inspection work.

Dr. D. J. Ryan (K. C. V. C. '11), from Chicago, Ill., to Kansas City, Kansas, on meat inspection work.

Dr. C. C. Conley (K. C. V. C. '05), from Burlington, Vt., to Boston, Mass., on meat inspection work.

Dr. S. J. Horne (K. C. V. C. '14), from Atlanta, Ga., to Jacksonville, Fla., on tick eradication work.

Dr. Daniel F. McCarthy (K. C. V. C. '18), from Chicago, Ill., to St. Louis, Mo., on meat inspection work.

Dr. Elwin J. Creely (San Fran. '14), from Salt Lake City, Utah, to Portland, Ore., on meat inspection work.

Dr. Hyman W. Gardner (Cin. '18), from Cheyenne, Wyo., to Jersey City, N. J., on meat inspection work.

Dr. Wm. Lee Carson (Chi. '13), from Salt Lake City, Utah, to Helena, Mont., on field inspection work.

Dr. Chas. A. Sayre (O. S. U. '14), from Madison, Wis., to Columbus, Ohio, on tuberculosis eradication work.

Dr. W. O. Ney (K. C. V. C. '07), from Jackson, Tenn., to Wheeling, W. Va., on tuberculosis eradication work.

Dr. Arthur C. Stever (U. S. '07), from Harrisburg, Pa., to Albany, N. Y., on tuberculosis eradication work.

Dr. M. E. Schwab (Cin. '16), from Grand Forks, N. D., to Indianapolis, Ind., on virus-serum control work.

Dr. Wm. F. Osborn (K. C. V. C. '08), from Chipley, Fla., to Pittsburgh, Pa., in charge of meat inspection work.

SOME KICK

"Your medicine has helped me wonderfully," wrote the grateful woman. "A month ago I could not spank the baby but now I am able to thrash my husband. Heaven bless you."

ANAPHYLAXIS AND THE TUBERCULIN REACTION¹

By A. B. CRAWFORD

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Since Richet, in 1902, coined the word "anaphylaxis" to describe a condition observed in animals receiving repeated injections of a substance derived from actiniae, this term has been applied indiscriminately to nearly every observed form of hypersensitiveness. In view of the broadness of the field of hypersensitiveness, and the somewhat related character of different manifestations, it has required extensive experimentation, study and review to bring a semblance of order out of the chaotic condition which existed in the earlier days in the study of these phenomena. Even at the present time, the classification of the different forms of hypersensitiveness is unsettled, but most of the essential principles are generally agreed upon.

It is proposed in this paper to give a brief review of the generally accepted ideas of true anaphylaxis, and to show wherein the tuberculin reaction and anaphylaxis appear to be different manifestations of allergy.

Excellent reviews of the subject of anaphylaxis have been given by Doerr,¹ Coca,² Wells,³ Zinsser,⁴ Dale,⁵ and others, and they agree practically on the main points that anaphylaxis is a state of hypersensitiveness that is due to the presence in certain tissues of specific antibodies, the symptoms of anaphylaxis being caused by the meeting of these antibodies with the respective antigen in these tissues; and that the anaphylactic state can be passively and specifically transferred to normal animals with the serum of a sensitized animal.

Wells³ lays down seven criteria, all of which must be met in true anaphylaxis:

1. The observed toxicity of the injected material must depend upon the sensitization of the animal, i. e., the substance must not produce similar symptoms in non-sensitized animals.
2. The symptoms produced must be those characteristic of anaphylactic intoxication, as observed with the usual reactions with typical soluble proteins, being therefore the same for all antigens with the same test animal, but differing characteristically with each species of animal.
3. It should be possible to demonstrate passive sensitization with the serum of sensitized animals.
4. It should be possible to demonstrate typical reactions in the virgin-guinea-pig-uterus strip.

¹Received for publication, March 15, 1924, and revised by author, Sept. 20, 1924, to include more recent data.

5. It should be possible to demonstrate amelioration or prevention of the bronchial spasm in guinea pigs by proper use of atropin and epinephrin.

6. The possibility that the observed symptoms are caused by capillary thrombosis must be excluded.

7. After recovery from anaphylactic shock, there should be exhibited a condition of desensitization under proper conditions.

Any antigenic substance that is capable of inducing the anaphylactic state in the animal body is known as an anaphylactogen. Anaphylactogens, without exception, are protein substances.

The train of events in anaphylaxis may be summarized briefly as follows. If 0.1 cc of horse serum, for instance, is injected into a normal guinea pig, the animal manifests no ill effects and the injected material is apparently innocuous. Eight to twelve days later, specific antibodies can be detected in the guinea pig's serum. At or subsequent to this time, if a determined quantity of horse serum is injected into the guinea pig, it will react in from a few minutes to an hour, depending upon the method of injection, whether intraperitoneally, intravenously or subdurally, with certain characteristic symptoms. The guinea pig may remain quiet for a minute or two, or it may begin at once to run about, evidently excited, pausing at times to scratch itself on nose or ears, and sometimes discharging urine and feces. Within one-half to two minutes it coughs several times with a violently convulsive effort or jumps convulsively without coughing, then staggers about a few seconds with arched body, and finally falls over, making violent rhythmical extension movements of the back and hind extremities accompanied by similar violent movements of the inspirating musculature of the chest, mouth and nose. From this time on, the symptoms are purely those of asphyxia. The guinea pig dies of asphyxia brought about by a tetanic contraction of the bronchial musculature which completely blocks the passage of air into and out of the lungs. (Coca.)

The antibodies produced by the sensitizing dose of the anaphylactogen are specific for that particular anaphylactogen. For instance, if a guinea pig is sensitized with horse serum, the injection of any other anaphylactogen such as egg white, rabbit serum, milk and so on, would be as innocuous as the primary injection of horse serum.

If the blood of a sensitized guinea pig is injected into a normal guinea pig, the state of anaphylaxis is passively transferred. Within a few hours after the transfer of the blood, the injected guinea pig will manifest the characteristic symptoms of anaphylaxis if injected with the specific anaphylactogen.

If a sensitized guinea pig receives an injection of less than a lethal dose of the specific anaphylactogen, little or no reaction occurs. A subsequent injection of what would have been a lethal dose is innocuous, and the blood of this animal will not convey passive sensitization. This is known as the process of desensitization.

Some investigators have concluded that the anaphylactic reaction is the result of the union of the antigen and the antibody in the body cells and not in the blood stream. In fact, it has been shown that an excess of free antibody actually tends to inhibit the anaphylactic reaction.⁶ It has also been shown in passive sensitization that if the anaphylactogen is injected simultaneously with or immediately after the blood transfer, no reaction takes place, it being necessary for the antibodies to become fixed to the body cells.

The most delicate test for anaphylaxis is by means of the Dale perfusion apparatus.^{7,8} A strip of the muscle of the isolated uterus of a sensitized, virgin guinea pig is placed in a perfusion bath of Ringer's solution in the Dale apparatus. The normal rhythmical contractions are shown by means of a needle on a recording plate. If the specific anaphylactogen is added to the solution, there is an immediate, violent contraction of the uterine muscle. The addition of any other anaphylactogen has no action on the sensitized uterus.

TUBERCULIN REACTION

Tuberculin does not react to any of the known tests for protein. Its exact chemical nature is not known, but it is believed by many to be of the order of polypeptids. It has been prepared from several different media containing no protein.⁹

Zinsser has shown that the filtrate of an alkaline extract of pulverized tubercle bacilli, after all traces of protein have been removed by heat and acid coagulation, contains a substance which has the same specificity and nature as tuberculin.

Tuberculin in a normal guinea pig is apparently innocuous. It does not cause a sensitization that can be detected by a subsequent injection. It is not therefore an anaphylactogen. It causes no reaction except in an animal sensitized by living or dead tubercle bacilli, and the reaction in such an animal is quite different from true anaphylaxis. For several hours after the intra-abdominal injection of a lethal dose of tuberculin, no symptoms are manifested. The animal lies down in a corner of

the cage and appears depressed; hair becomes roughened, eyes dull, and breathing shallow and quickened. The depression becomes progressively more marked, and just before death the animal lies on its side and its breathing becomes very labored and stertorous. As a result of a lethal intra-abdominal injection of tuberculin, there is a congestion of the abdominal serosa, and sometimes a sero-fibrinous exudate is present, but the chief manifestations are around the tubercles. Irrespective of location, most of the tuberculous foci show considerable peripheral inflammation and congestion. The inflated appearance of the lungs, characteristic of anaphylaxis, is not present.

No reference was made in the discussion of anaphylaxis to the cutaneous reaction, in order that it could be more closely compared to the tuberculin skin reaction. The two types of skin reactions are described by Zinsser¹⁰ as follows:

"A basic fact in regard to skin reactivity is the occurrence, in man and guinea pigs, of two fundamentally different types of such reactions, both of them to a considerable degree specific, yet differing both in the nature of the completed reactions and in the time factors concerned in their development.

"1. (Immediate type.) The intradermal reaction, which appears in from two to three to fifteen minutes after injection of the antigen. It expresses itself in the development of a growing wheal, often surrounded by a red areola of variable size. This reaction may last from one-half to one or two hours, and fades again, usually without leaving any profound injury to the tissues. This is the reaction obtained in man to determine whether or not a particular individual is sensitive to horse serum or other protein substance when therapeutic injections are intended.

"2. (Delayed type.) The other type of skin reaction is one in which there is no immediate effect, but in which within four, five, or more hours, a swelling becomes apparent which in the course of twelve to twenty-four hours results in a swollen, edematous area of varying intensity, often with a central necrotic spot and occasionally hemorrhage. This reaction may not reach its highest development until two to three days after the injection, and is accompanied by distinct signs of inflammation and some cell death."

Anaphylactic guinea pigs generally react with the "immediate" type of skin reaction, while the "delayed" type of reaction is characteristic of the tuberculin intracutaneous reaction.

Zinsser¹¹ has reported several experiments which differentiate the anaphylactic from the tuberculin reaction. Using the isolated uteri of tuberculous guinea pigs, he has shown that with a soluble protein derived from pulverized tubercle bacilli, he could obtain the characteristic anaphylactic reaction, while with tuberculin no reaction could be obtained using amounts which were non-specific for normal uteri. He has also shown in another experiment that the sensitiveness to tuberculin appears several days before the anaphylactic reaction can be obtained with the isolated uteri of tuberculous guinea pigs.

The recent investigations of Long,^{12, 13} on reinfection in tuberculosis, in which the testicle is used as a medium, also clearly indicate that a different mechanism is involved in the tuberculin reaction than in anaphylaxis.

He has shown that tuberculin, prepared either from a protein or non-protein medium, when introduced in small dose into the testicle of a tuberculous guinea pig, causes a prompt reaction with marked hyperemia and swelling, and a progressive degeneration of the germ cells, beginning with intracellular edema, extending to hydropic degeneration and necrosis, and ending after four weeks with complete absorption of all but an undifferentiated lining epithelium. Sterilization of the testicle is complete. Tuberculin in a small dose has no effect, either early or late, upon the testicle of a non-tuberculous guinea pig.

In contrast to the tuberculin reaction, there is no recognizable anaphylactic reaction in the testicle. When the specific antigen is introduced in the testicle of a sensitized guinea pig, only a transient wandering-cell infiltration occurs. The germ cells are not affected.

It will thus be seen that the anaphylactic reaction and the tuberculin reaction differ in a number of respects. These may be summarized as follows:

1. Anaphylactogens, without exception, are proteins; tuberculin has not been shown to be a protein.
2. Anaphylactogens sensitize normal guinea pigs; tuberculin does not sensitize.
3. In anaphylaxis, the reaction is immediate, while the tuberculin reaction is not manifested for several hours.
4. In anaphylaxis, the reaction is characterized by excitability, peripheral irritation and asphyxia; the systemic tuberculin reaction suggests a toxemia.
5. In anaphylaxis, there is a fall in temperature; in the tuberculin reaction, there is a rise in temperature.
6. In anaphylaxis, the cutaneous reactions are of the "immediate" type; tuberculin elicits the "delayed" type.
7. Anaphylactogens have a specific action on the uteri of sensitized guinea pigs; tuberculin does not have a specific action on the uteri of tuberculous guinea pigs.
8. The anaphylactic state can be passively transferred to normal guinea pigs; normal guinea pigs cannot be made sensitive to tuberculin through the injection of serum of a tuberculous animal.

9. Anaphylactogens have no local effect on the testicle of sensitized guinea pigs, while tuberculin injected into the testicle of a tuberculous guinea pig causes profound degeneration and complete sterilization.

In view of the foregoing, it would seem that the tuberculin reaction should not be referred to as a manifestation of anaphylaxis but should be classified under the broader head of allergy or hypersensitiveness.

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GOOD WORK, KENTUCKY!

Following close upon the recent meeting of the Kentucky Veterinary Medical Association, in Frankfort, July 9-10, the following splendid editorial, entitled "The Veterinarian," appeared in the Louisville, Ky., *Courier-Journal*, Sunday, July 13, 1924:

"Affection and infection are both communicated by direct contact; but, unfortunately for the human race, affection is a home body, while infection is a great traveler. People who will rush a beloved Pomeranian pup to the nearest veterinarian, when it is ill, have no interest in the health of the cow, which furnishes their children milk, because they are not acquainted with the cow. Yet health authorities assert that 75 per cent of the gland cases among children originate from bovine tuberculosis, and 65 per cent of general tuberculosis, and 25 per cent of the deaths of children from that disease can be traced to the same source.

"Individuals, of course, are rather helpless to improve their milk supply, but municipalities are generally recreant to their responsibilities, and could greatly facilitate the work being done by the Federal Bureau and Live Stock Sanitary Board by strict enforcement of drastic measures against uncertified herds. Government regulations of stock yards and transportation have accomplished most by interfering with traffic in diseased animals.

"The discovery that many terrible diseases of domestic live stock can be communicated to human beings has placed increased responsibility on the veterinarian, and the profession has risen to the occasion in spirit and in scientific attainment. They have almost eradicated anthrax, they are vaccinating dogs against hydrophobia, and they are fighting infant tuberculosis at its source.

"Statistics made public at the recent meeting of the Kentucky Veterinary Medical Association rank high among the States in the progress being made in herd testing. The best sign is that as the work proceeds opposition subsides and requests for attention increase.

"A toilsome fight has been waged for an indifferent populace, from the research laboratory to the cow pasture and the pig pen, and the people of the United States owe more to the veterinarian than they will ever know."

STUDIES OF BIOLOGICAL PREPARATIONS BY COMPLEMENT-FIXATION METHODS

II. Tuberculin: A New Method of Standardization

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The basis of all official or accepted methods for estimating the toxicity and potency of tuberculins rests upon Koch's original discovery that tuberculous animals react characteristically when injected with suitable doses of tuberculin, non-tuberculous animals being unaffected by similar dosage.

The technic and procedure followed in different laboratories and state institutions may vary somewhat in details, but the method and the basic principles of the test, whether it be the German official test, as practised in Frankfurt, or the United States Bureau of Animal Industry potency test, as devised by Schroeder and Brett,¹ are essentially the same. Whatever modification is employed, the potency tests are performed upon a series of guinea pigs, and we may refer to this method in general terms as the guinea pig standardization or potency test. Laboratory workers know full well the many difficulties, disadvantages and inconveniences that this method involves. It requires, in the first place, a large number of experiment animals (at least 25 for a single sample of tuberculin, and from 7 to 10 more for each additional sample). The guinea pigs have to be carefully selected, so that they are approximately uniform in weight, size and condition. Each animal must receive a carefully measured dose of a suitable suspension of tubercle bacilli. After a delay of several weeks, preliminary tests are commenced for determining the degree of sensitization, and only when it appears that the animals are sufficiently and equally sensitized can the actual potency tests be applied. Even then the factors making for error and inaccuracy are considerable; some guinea pigs will prove to have more resistance than others, some will increase in weight, while others will show a decrease, or complications may arise, and it is practically impossible to obtain the same degree

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of sensitiveness to tuberculin in each of a large batch of tuberculous guinea pigs at the same moment.

It is admittedly a laborious, time-consuming and expensive method, and in the final result little more can be said than that the potency of the tuberculin under test, according to the percentage of the test animals which react or succumb, is either equal to, superior to, or inferior to the potency of a certain tuberculin previously tested in the same manner and regarded as of standard potency. By this method it is practically impossible to determine the minimum lethal dose of tuberculin or to express the value of a dose of tuberculin in units of antigenic activity.

The use of the terms "antigen" and "antibody," as applied to tuberculin and opposing sera, may be questioned. Tuberculin has not the properties of a true bacterial toxin or antigen according to our present conception of these substances. The nature of the tuberculin reaction and the different theories advanced in regard to it will not be discussed in this paper, the immediate object of which is to show the practical application of complement-fixation methods for the standardization of tuberculin. In this connection we shall frequently have occasion to refer to tuberculin and anti-sera as antigen and antibody, respectively.

In a previous paper¹ we have dealt with the antigenic variations of mallein and have proposed a method of standardization of mallein in the presence of a specific anti-mallein serum. We have put the method into routine practice and find it satisfactory. In this paper, applying the same principles and similar methods, we deal with tuberculin.

We would remark, however, at the outset, that mallein and tuberculin differ profoundly from each other in their properties as antigens to produce specific antibodies. Normal and non-glandered horses and other animals can be sensitized with mallein and can be made to furnish a hyperimmune serum rich in complement-binding antibodies, as we have already shown. Our attempts to sensitize and immunize normal and non-tuberculous horses, cattle, sheep and other animals with "Koch's Old Tuberculin" have failed. In other words, the sterilized (heated) filtered product of glycerin-bouillon cultures of *Bacillus mallei* suffices for the sensitization of animals free from glanders infection; but the similarly prepared product of *B. tuberculosis* does not permit of the sensitization of animals free from tuberculosis infection. On the other hand, applying the complement-fixation

test to known tuberculous animals, and employing tuberculin (O. T.) as the antigen, we have noted complement-binding properties of the test serum in incipient stages of infection and even in certain phases of the chronic state. All attempts to enrich the sera of such animals by injections of tuberculin (O. T.), either by subcutaneous or intravenous administration, were unsuccessful. Indeed, an opposite result was obtained, the complement-binding properties tending to disappear subsequent to repeated injections of tuberculin. We had a similar experience with intravenous injections of unheated tuberculin (B. F.), i. e., "bouillon filtrate." As a case in point, a young tuberculous heifer gave positive fixation reactions previous to the injections of tuberculin (B. F.) and negative reactions subsequently. A similar phenomenon has been noted by Besredka and Manoukhine² in tuberculous guinea pigs, when heated tuberculin was used. They offer the hypothesis of neutralization of the tubercular antibodies by tuberculin.

Nevertheless, in a non-tuberculous animal we did obtain a partial or transient sensitization by injections of bouillon filtrate. A healthy horse, at intervals of three days, was given two subcutaneous and one intravenous injection of tuberculin (B. F.). On the eighth day after the last injection, this animal's serum, in a dose of 0.08 cc, bound complement equally well with tuberculin B. F. and with tuberculin O. T., while the serum taken before the first injection did not possess any fixation properties with either tuberculin. After a fourth intravenous injection of bouillon filtrate, the titer of the serum dropped to 0.1 cc on the fifth day, and to 0.2 cc on the eleventh day following. Four more injections failed to raise the titer of the serum and resulted in the total disappearance of the complement-binding properties. That this transient sensitization following injections of unheated bouillon filtrate was not due to any living bacilli present in the filtrate was proved by the inability of the filtrate to produce infection in small animals.

Koch's tuberculin (O. T.), as is well known, has been frequently tried as antigen in complement-fixation tests for the diagnosis of tuberculous infection, but there is general agreement among those workers who have tried it as such, that it is less satisfactory than some other forms of antigen in complement-fixation diagnostic tests. However, our own experience in examining the sera of many tuberculous cattle, by the complement-fixation method, using in addition to tuberculin various other

forms of tuberculo-antigen, has usually been that in certain stages of infection positive reactions are given with tuberculin as the sole source of antigen. We therefore decided to make a careful study of this reaction and to follow it from the very beginning in artificially infected animals.

For this purpose, and in a further attempt to obtain an immune serum suitable for the titration of tuberculin, a normal horse and a normal steer were selected for experiment. After complement-fixation and combined intradermal and ophthalmic tests had given clear negative results, the animals were infected by intravenous inoculations of a virulent culture of tubercle bacilli, 1.0 mgm. moist weight being given for the first inoculation. Fourteen days later, when serum tests were still negative, a second inoculation of 2.0 mgm. of the same culture was administered. On the twenty-sixth day of the experiment, serum tests were positive for the first time, the fixation titer of the horse serum being 0.033 or 30 units per cc and that of the ox 0.05 or 20 units per cc. On the thirty-fifth day the titer of the horse serum had risen to 0.02 or 50 units per cc and that of the ox serum to 0.033 or 30 units per cc. Combined intradermal and ophthalmic tuberculin tests gave typical reactions in each animal. The horse, but not the ox, now received a third and final inoculation of 3.0 mgm. of tubercle bacilli. Seven to fourteen days later, during the seventh week of the experiment, the peak of the fixation curve was reached, the titer being 0.0066 or 150 units per cc for the horse, and 0.02 or 50 units per cc for the ox. The fixation curve then fell steadily.

In brief, during the first seventy-seven days of the experiment, blood was collected at intervals of approximately one week, and with the eleven samples of serum obtained from each animal respectively, eleven series of fixation tests were carried out. The horse furnished serum of a higher titer than that of the ox, the titer of the former rising to 150 units per cc on the forty-second day and then declining. This animal died on the one hundred thirteenth day. Postmortem examination showed the early granulation stage of a miliary form of tuberculosis of the lungs.

During the seventh week of the above experiment a considerable quantity of anti-serum was collected under sterile conditions and put away in 1-cc ampules for future use. This serum contained 150 active units per cc, titrated against a fixed dose of standard tuberculin, and proved to have a still higher activity for suspensions of tubercle bacilli and other tuberculo-antigens.

It was quite inactive for mallein, abortin and glycerin-bouillon culture media.

TITRATION AND ACTIVITY OF TUBERCULINS

The dose of anti-serum best suited for titrating tuberculins was arrived at by preparing five sets of suitable dilutions of standard tuberculin, and adding to each set 2½, 5, 10, 20 and 30 units of anti-serum respectively. The sets containing 10 and 20 units of anti-serum were found to give the best gradation, and no advantage was apparent in exceeding that amount. Accordingly, a fixed dose of 20 units of anti-serum was used in all subsequent titrations of commercial tuberculins. The minimum amount of tuberculin, added to 20 units of anti-serum, that is capable of completely fixing the unit of complement may be said to represent one active unit of tuberculin.

The activity of different tuberculins, expressed in terms of active units, was determined for seven samples of commercial tuberculins, obtained direct from the manufacturers or through their agents, in a series of titrations including two standard tuberculins. A wide variation in antigenic activity, ranging from 0 to 2400 active units per cattle dose recommended by the manufacturers, was noted.

The summary of these titrations is shown in table I.

TABLE I—*Antigenic evaluation of tuberculins—Series 1*

TUBERCULIN			ANTIGENIC EVALUATION	
SAMPLE	KOCH'S O. T. PER CC	CATTLE DOSE	UNITS PER CC	UNITS PER CATTLE DOSE
I (Standard)	0.125	4.0 cc	200	800
II (Commercial)	0.125	4.0 cc	100	400
III "	0.125	4.0 cc	600	2400
IV "	0.125	4.0 cc	100	400
V "	0.125	4.0 cc	20	80
VI "	0.125	4.0 cc	0	0
VII "	0.125	4.0 cc	0	0
VIII "	0.125	5.0 cc	100	500
IX (Standard)	0.160	2.5 cc	300	750

In this series the tuberculins designated as samples I and IX may be said to be of standard potency. The former is a product of the Bureau of Animal Industry, Washington, D. C., and the latter a product of the Biological Laboratory, Health of Animals Branch, Ottawa, Ont. Each gave the standard reactions in potency tests on guinea pigs according to the method devised by Schroeder and Brett.³ The remainder are samples of tuber-

culins of commerce, put up and sold for veterinary use as standardized tuberculins.

The full diagnostic cattle dose of tuberculin; as stated or recommended by the manufacturer, is usually 4.0 cc and this amount is said to contain 0.5 gms. of Koch's Old Tuberculin. There are a few exceptions. The cattle dose of our own tuberculin is 2.5 cc and contains 0.4 gms. of K. O. T. In this series of titrations, the number of active units in a cattle dose of the standard tuberculins I and IX is 800 and 750 respectively, the tuberculins of commerce ranging between 0 and 2400 units per cattle dose. Thus, one sample appeared to be three times more active than the standard tuberculins; two samples showed only one-half and one sample one-tenth of the standard activity, while two samples appeared to be quite inert or devoid of antigenic properties.

How does this wide range of activity compare with the activity as shown by potency tests on guinea pigs?

The guinea pig potency test was made with three of the above samples of tuberculins of commerce and our standard tuberculin, for comparison with the titration method. Thus:

A batch of tuberculous guinea pigs, when preliminary tests with standard tuberculins had shown a favorable degree of sensitiveness, were divided into four lots of six pigs. The six pigs in each series received doses of tuberculin graduated from two full cattle doses to one-quarter of a cattle dose per 500 grams weight of guinea pig. The results are tabulated as follows:

TABLE II—A potency test on tuberculous guinea pigs

TUBERCULIN SAMPLE	UNITS PER CATTLE DOSE	CATTLE DOSES INJECTED PER 500 GRAMS GUINEA PIG WEIGHT					
		2	1½	1	1	½	¼
III	2400	+	+	+	+	+	—
V	80	—	—	—	—	—	—
VII	Nil	+	—	—	—	—	—
IX	750	+	+	+	+	—	—

+ = died within 24 hours.

As stated, only six pigs were used for each sample of tuberculin. For a proper titration, the range of dosage would need to be more finely graduated and a much greater number of guinea pigs employed, e. g., six pigs for each graduated dose. However, it may be seen that the degree of potency, roughly indicated in this test, more or less accords with the degree of antigenic activity indicated in table I.

THE ANTIGENIC VALUE OF TUBERCULIN OPHTHALMIC DISCS OR TABLETS

Four samples of ophthalmic tuberculin discs or tablets of commerce and a sample of our own manufacture were examined for antigenic properties of our fixation method. One tablet of each sample was dissolved in 10 cc of normal saline solution. Dilutions were made in series, 1.0 cc of each dilution being added to 20 units of anti-serum and one unit of complement. The highest dilution in which complete fixation occurs indicates the unit value, and from this is reckoned the number of units in one diagnostic disc or tablet. The results of this test are tabulated in table III.

TABLE III—*Titration of ophthalmic discs*

TUBERCULIN SAMPLE	NO. OF ANTIGENIC UNITS CONTAINED IN ONE OPHTHALMIC DISC
Commercial	
X	400
XI	20
XII	50
XIII	250
Biological Laboratory, Ottawa	
XIV	500

THE STANDARDIZATION OF TUBERCULIN

The possibility of arriving at a satisfactory method of standardizing tuberculin by antigenic evaluation now presented itself. Evidently, our system of titration would be of little practical value unless we could be sure of obtaining a suitable anti-serum. The procedure followed in obtaining the serum employed in the foregoing titration experiments we have already described. By a more or less similar method of inoculation and procedure in another horse, with the difference that this animal, before being infected with *living tubercle bacilli*, had received a series of injections of bouillon filtrate and two suspensions of bacilli heated at 65°C., an anti-serum was obtained equally satisfactory for titrating tuberculin.

The serum of each animal, without the addition of any preservative, stored in the refrigerator, retains its specific property of combining with tuberculin for a considerable period of time. The serum of the first animal (horse 10) collected on August 24, 1922, titered at 150 units per cc; one year later the titer was 100 units per cc. The serum of the second animal (horse 8) collected on May 16, 1923, titered at 100 units per cc and 10

months later, March, 1924, at 80 units per cc. This slightly lessened activity during the periods mentioned did not cause any difficulty, nor was there any untoward action, when a 10-15 unit was used in the titration of tuberculins.

No insurmountable difficulty, therefore, need be anticipated in the production of this all-important reagent. Most probably, further experiments will result in a method of preparing an animal for serum production superior to that which we have indicated, and which will confer a more lasting relative immunity.

In reading our complement fixation reactions and estimating the value of one unit of tuberculin antigen we at first drew the dividing line at a four-plus (+ + + +) reaction with the highest dilution, that is to say, in the last tube of the series in which there was not the faintest trace of hemolysis. By this reading our standard tuberculins have titrated at approximately 800 units per cattle dose. Latterly we have substituted the three-plus (+ + +) reaction, that is, the highest dilution in which only the first trace of hemolysis is apparent by a pink tinge of the supernatant fluid. By this reading the number of units per cattle dose for standard tuberculin approximates 1000.

For more than a year past we have titrated each new lot of tuberculin prepared in our own laboratories. Ten lots in all, in quantities averaging 10 litres per lot of concentrated Koch's Old Tuberculin, have been standardized by finding the titer of each sample and diluting the concentrated product to the equivalent of 800-1000 units per cattle dose. With each titration test, sets of previously standardized tuberculins were included for controls. Each lot of tuberculin standardized in this manner has then been submitted to the guinea pig potency test and has always fulfilled the requirements of the latter for a tuberculin of standard potency.

We therefore feel justified in considering 750 to 1250 units as a satisfactory range of antigenic evaluation for a cattle dose of tuberculin of standard strength. This bracket suffices to cover the margin of error in practicing the technic of the test and in interpreting the degree of fixation of complement.

Throughout our work we have followed the procedure indicated for the titration of mallein¹ which in turn is based upon that recommended for the complement-fixation test for dourine.⁴ We employ a rabbit-antisheep hemolytic system, using 2 units of hemolytic amboceptor, 1 unit of complement and 0.5 cc of a 4% suspension of sheep cells. Many different procedures, systems

and modifications are practiced in different laboratories in connection with complement-fixation technic. It is to be expected that the evaluation of a tuberculin will almost certainly differ, quantitatively, according to the procedure practiced and the quantitative value of the reagents employed in the hemolytic system. The difference, however, will be in the same proportion for the standard tuberculin as for the superpotent and subpotent tuberculins and for those of unknown strength. Nevertheless, if this new test method is tried out in other laboratories and is accepted in principle, it would be desirable, for obvious reasons, to standardize the test itself and to fix upon a definite value, both quantitatively and qualitatively, in terms of active units, for a tuberculin of standard or normal potency.

The varying amount of tuberculin, 2.5 to 4.0 cc, stated by the manufacturer as a cattle dose, also the varying content of Koch's Old Tuberculin, 0.125 to 0.2 gms per cc, is apt to lead to some confusion, if not to uncertainty and a loss of confidence in the tuberculin test. It is common knowledge that some veterinarians habitually favor twice the dose recommended, while others, particularly for a retest of a suspicious reactor, may administer three or more times the usual dose. We doubt the wisdom or the necessity for such practice unless there is reason to believe that the tuberculin employed is of a low degree of potency, and in that case it would be better to discard that tuberculin. If tuberculins were accurately standardized to contain a given number of active units per cc, regardless of the amount of Koch's Old Tuberculin per cc, then it would be possible to experiment more intelligently as to quantitative testing.

Before publication of this material we desired to undertake a further practical test of our proposed method of standardization and to have it checked with the guinea pig potency test. In this our colleagues of the Bureau of Animal Industry, Washington, D. C., have very kindly cooperated. Dr. E. C. Schroeder, Director of the Experiment Station, Bethesda, Md., sent to us twelve samples of liquid tuberculins, each of different manufacture, eleven being tuberculins of commerce, submitted to the United States Government for test as required by law.

The guinea pig potency test was undertaken by Dr. Schroeder, at Bethesda, and simultaneously we made our tests by the complement-fixation method, at Ottawa. The results of the latter are given in table IV.

TABLE IV—*Antigenic evaluation of tuberculin—Series 2.*

SAMPLE	TUBERCULIN		ANTIGENIC EVALUATION	
	Koch's O. T. PER CC	CATTLE DOSE	UNITS PER CC	UNITS PER CATTLE DOSE
A	0.125 gms.	4.0 cc	0	0
B	0.125 "	4.0 "	600	2400
C	0.125 "	4.0 "	150	600
D	0.125 "	4.0 "	350	1400
E	0.125 "	4.0 "	30	120
F	0.125 "	4.0 "	60	240
G	0.125 "	4.0 "	200	800
H	0.125 "	4.0 "	60	240
I	0.125 "	4.0 "	350	1400
J	0.2 "	2.5 "	250	625
K	0.15 "	4.0 "	800	3200
L	0.125 "	4.0 "	300	1200
P (Standard)		2.5 "	500	1250
Q-R (Standard)		2.5 "	500	1250
S (Not Standardized)		2.5 "	800	2000
T (Not Standardized)		2.5 "	700	1750

In the order of their antigenic evaluation and in accordance with our tentative standard of 750—1250 units per cattle dose, these tuberculin were classified as shown in table V.

TABLE V—*Classification of tuberculin, according to antigenic value*

SAMPLE	UNITS PER CATTLE DOSE	POTENCY
K	3200	Superpotent
B	2400	Superpotent
D	1400	Slightly superpotent
I	1400	Slightly Superpotent
L	1200	Potent (Normal Standard)
G	800	Potent (Normal Standard)
J	625	Questionably potent
C	600	Questionably potent
F	240	Subpotent
H	240	Subpotent
E	120	Subpotent
A	Nil	Subpotent (Inert)
S (Not Standardized)	2000	Superpotent
T (Not Standardized)	1750	Superpotent
Q-R (Standard)	1250	Potent (Normal Standard)
P (Standard)	1250	Potent (Normal Standard)

(Samples S, T, Q-R, and P are products of the Biological Laboratory, Ottawa.)

The results of these complement-fixation tests were compared with the results of the guinea pig potency tests made by Dr. Schroeder, who very kindly permits us to make use of his statements and tables as follows:

"The dose of tuberculin injected into the guinea pigs was, in all cases excepting where a statement to the contrary is made, the equivalent of 0.25 grams of Koch's Old Tuberculin per 500 grams weight of guinea pig. All injections of tuberculin were intra-abdominal.

"Feb. 4, Three guinea pigs injected with B. A. I. tuberculin of proved, standard potency. One died and two survived.

"Feb. 6, Three guinea pigs injected with B. A. I. tuberculin of proved, standard potency. Two died and one survived.

"Feb. 7, Six guinea pigs injected with B. A. I. tuberculin of proved, standard potency. Three died within 24 hours and three showed very strong reactions but eventually recovered.

"From the above tests it was concluded that the tuberculous guinea pigs had reached a degree of tuberculin sensitiveness which would make them serviceable on February 9. Hence the tests, the results of which may be tabulated as follows (table A), were begun on the named date."

TABLE A—Results of guinea pig tests (Schroeder)

SAMPLE OF TUBERCULIN	TUBERCULOUS GUINEA PIGS INJECTED	DIED WITH- IN 24 HOURS	DIED AFTER 24 HOURS	STRONG REAC- TION, WITHOUT DEATH	WEAK REAC- TION	NO REAC- TION
A	6	0	0	0	0	6
B	5	5	0	1	0	0
C	6	4	0	2	0	0
D	6	4	0	2	0	0
E	6	1	0	4	0	1
F	6	0	0	1	1	4
G	6	0	0	2	1	3
H	6	1	0	4	1	0
I	6	6	0	0	0	0
J	6	3	0	3	0	0
K	6	6	0	0	0	0
L	6	1	0	4	0	1

"Three samples of tuberculin, B, I and K, evidently are superpotent, and two samples, C and D, are close to superpotent. Sample J, which caused three deaths and three strong reactions, I regard as possessing the ideal potency.

"Samples E, H and L probably would have to be permitted to pass, because, though they did not prove fatal to a sufficiently large proportion of the guinea pigs, they caused strong reactions in most of the guinea pigs that survived.

"Samples A, F and G are plainly of insufficient potency."

"After the tabulated tests were completed, additional tests were made regarding the superpotency of samples I and K, the low potency of samples H, E and L, and the subpotency of samples A, F and G. The results are shown in the following table (B)."

TABLE B—Results of further guinea pig tests (Schroeder)

SAMPLE OF TUBERCULIN	TUBERCULOUS GUINEA PIGS INJECTED	DIED WITH- IN 24 HOURS	DIED AFTER 24 HOURS	STRONG REAC- TION	WEAK REAC- TION	NO REAC- TION
I*	3	3	0	0	0	0
K	3	3	0	0	0	0
H	4	0	1	2	1	0
E	4	1	1	1	1	0
L	4	0	1	2	1	0
A	4	0	1	0	0	3
F	4	0	0	3	0	1
G	4	1	2	0	1	0

*The guinea pigs in table B were injected with tuberculin on February 11. The doses received by I and K were $\frac{3}{4}$ of 0.25 grams of Koch's Old Tuberculin per 500 grams weight of guinea pig. The doses received by the other guinea pigs were 0.25 grams of Koch's Old Tuberculin per 500 grams weight of guinea pig.

"This second test justifies adding G to the list, with H, E, and L.

"The superiority of I and K is again shown, but no satisfactory measure of its degree is obtained."

In commenting upon the two methods, Dr. Schroeder writes: "Truly there is a close parallelism between the results with your complement-fixation and the Station's guinea pig tests, so close, that, had I based my recent recommendations for action on the part of our Virus-Serum Control Division regarding commercial tuberculin on your tests in the place of the Station's, they would have been practically the same. * * * Your tests determine, not only whether a tuberculin is potent, subpotent or superpotent, but actually how many active units a given quantity contains, a thing the guinea pig could not do without an enormous amount of work and a virtually prohibitive cost, because of the number of experiment animals it would require."

CONCLUSIONS

1. The horse is a suitable animal for the production of a serum reacting with tuberculin to deviate complement.
2. A satisfactory sensitizing serum can be obtained from the horse during the brief period of relative immunity following intravenous injections of living tubercle bacilli.
3. The activity of tuberculin can be measured by titrating the product with a suitable dose of sensitizing serum.
4. The antigenic evaluation and activity of tuberculin of different origin and manufacture varies exceedingly.
5. The complement-fixation method is comparable with the guinea pig test method as an indicator of potency, superpotency and subpotency; but the former, in addition, actually determines the number of active units in a given quantity of tuberculin.

ACKNOWLEDGMENT

We desire to acknowledge our indebtedness and to express our thanks to Dr. E. C. Schroeder for material aid and for his independent tests which permitted of a comparative study of the two methods.

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NO-LESION AND SKIN-LESION TUBERCULIN- REACTING CATTLE¹

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During the entire period in which tuberculin has been used for testing cattle, the occurrence of animals which gave a positive reaction and which revealed no lesions of the disease on careful postmortem examination has been noted. It has been the custom to give little consideration to such cases. The students of tuberculosis have been inclined to consider a positive reaction as absolute evidence of the disease in the animal, no matter whether lesions could be demonstrated or not. Schroeder,¹ in a recent article, quotes Calmette, the French authority, to the effect that a positive reaction means infection with the tubercle bacillus. One must infer that in making such statements the writer has in mind animals which had given such responses to tuberculin and that there was no question as to whether the reactions were to be considered as positive or not. The veterinarians have been inclined to make the same sort of statements, and it would certainly add to the peace of mind of the farmer if he could believe that his animals, which have reacted to the test but have shown no lesions, are nevertheless always tuberculous.

During the first decade or more in which tuberculin was used as a diagnostic agent the conditions under which it was employed tended to minimize the importance of no-lesion cases. They made up such a small percentage of the total as to attract little attention. The test was, during this period, used largely on known infected herds and in regions where the disease was quite prevalent. At present the tuberculin test is more widely used in regions in which but a small percentage of the cattle react and in which the healthy herds outnumber many fold the infected. Under these conditions the no-lesion cases become more prominent and force themselves on our attention.

Bruner² has pointed out that as the percentage of reacting animals decreases, the percentage of no-lesion cases increases. Evidence of the same nature was presented by one of us³ a number of years ago. Indeed, this was at a time when many were assert-

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ing that 99 per cent of all reacting cattle should reveal lesions on postmortem examination, if the testing had been done correctly.

The inability of the workers in this state to duplicate the records of others was ascribed by some to inefficient work. Table I is from the reference last quoted:

TABLE I—*The relation of no-lesion animals to the percentage of the herd affected*

NUMBER OF ANIMALS REACTING IN HERD	NUMBER OF HERDS FROM WHICH ANIMALS WERE REMOVED	NUMBER OF ANIMALS KILLED	NUMBER OF NO-LESION ANIMALS	PER CENT NO-LESION ANIMALS
1	1,063	1,063	458	44.0
2	346	692	248	35.8
3 or 4	110	699	188	26.9
5 to 9	207	1,167	135	13.1
10 or more	120	2,105	145	6.8
Total . . .	1,846	5,726	1,184	20.6

It is to be noted that as the disease becomes more prevalent in the herds the percentage of no-lesion cases decreased rapidly, although there are factors which should tend to work in the opposite direction if the most commonly accepted explanation for the no-lesion cases is valid. It is common to ascribe the no-lesion case to incipient tuberculosis. Such a condition should occur more frequently in herds in which many animals are affected, and in which the disease is likely to be spreading, than in herds in which but one reactor is found. The opposite condition seems, however, to obtain. When only the herds mentioned in table I, from which three or more animals were removed, are considered, the percentage of no-lesion animals is 11.7, a value quite comparable to that obtained by the Bureau of Animal Industry in its work during the last year.

During recent months 30,010 cattle have been tested in one of the counties of this state. Reactors to the number of 337 were found, or 1.12%. The reactors averaged 1.6 per herd. The percentage of no-lesion animals was 22.55. In another county 21,669 cattle were tested. Here 183 reacted, a percentage of 0.844. The reactors averaged 1.5 per herd. The percentage of no-lesion animals was 25.13. If, from the table given above, the herds are omitted from which 10 or more animals were removed, the average of the remainder will be 1.6 animals removed from each herd, and the percentage of no-lesion animals will be 34.8. These values are of the same magnitude as those recently found in herds from which the same average number of animals were removed. The earlier work was all done with the thermal test,

the later work with the intradermic test. These results are to us of significance in indicating what we may expect, in the future, when large areas are being so handled as to reduce tuberculosis to the vanishing point. There should, of course, come a time when no reactors will be found if the tubercle bacillus is the only organism which can sensitize to tuberculin. If there are, however, saprophytic organisms related to the tubercle bacillus which may invade the tissues, they may sensitize the animal to tuberculin. Again, if this should prove to be the case, reactors to the test would continue to be found, a condition which might cast discredit on the eradication work, since the farmers have been led to believe in the specific nature of the test and therefore in the coming of a time when, if the testing is continuously carried out, no animals will need to be removed from the herds.

Schroeder points out that a portion of the no-lesion cases are due to occult tuberculosis, so-called because it is incipient, because the lesions occur in parts of the body not usually affected and because these lesions are not characteristic macroscopically. The Bureau of Animal Industry⁴ reports obscure lesions in 60 unusual locations. The animals showing such lesions made up but 0.7% of all examined. It would thus seem that such lesions explain but a part of the no-lesion cases. It is probable that all of these factors enter into the problem presented by the no-lesion case.

The detailed laboratory examination of tissues will reveal the tubercle bacillus in a portion of the no-lesion cases, as Schroeder has pointed out. He is inclined to think that the human tubercle bacillus may sensitize an animal to tuberculin and yet not produce an evident form of the disease. If this possibility exists, it would seem that its importance could be demonstrated since we know the properties of the human tubercle bacillus, the experiment animals it will infect, the culture media on which it will grow, etc. We believe, however, that there are causes for no-lesion cases other than any factors considered by most workers.

Reasoning from analogy, one would not expect to find the tuberculin test specific. One would expect that other organisms, closely related to the tubercle bacillus, might sensitize an animal to tuberculin. The group reactions are to be found in many fields; for example, an immune serum produced through the use of any member of the colon-typhoid group is likely to cause some

agglutination with all of the members of the group. The differences will be quantitative rather than qualitative.

Verge⁵ has reported that, in using the complement-fixation test for the detection of tuberculosis, various organisms related to the tubercle bacillus can be used as antigen. There is a great group of acid-fast bacteria which have other properties in common with the chief member of this group, the true tubercle bacillus. One might expect that some of these might cause sensitization to tuberculin.

Within recent years, in an attempt to find lesions in a larger percentage of reacting cattle, considerable attention has been devoted to the examination of the skin and the underlying tissues. The result has been that skin lesions only were found in about 3 per cent of the reacting animals. These lesions are reported as those of tuberculosis. So far as we are aware there was little justification for classing them as tuberculous. Some have thought that such lesions might be caused by the avian tubercle bacillus. Day,⁶ of the Bureau of Animal Industry, has reported on feeding experiments with chickens. He was unable to infect chickens by feeding such skin lesions from 113 cattle over considerable periods of time. It seems probable that the avian tubercle bacillus can not be the cause of the sensitization and lesions.

We have thought it worth while to make a more detailed examination of skin lesions with the idea of finding whether they were truly tuberculous in nature or not. The specimens were sent to us through the courtesy of Dr. A. E. Behnke, B. A. I., Inspector-in-charge, at Milwaukee. No information was obtained concerning the distribution of lesions in the body of the animal from which the skin lesions came. The animals furnishing the lesions showed no other evidences of tuberculosis. Again, no effort was made to secure information concerning the extent to which the disease was present in the herd from which the animals came.

The lesions were examined microscopically for acid-fast bacilli. A number of slides were made from each specimen and considerable time was spent in search. Cultures were made from the lesions on Petroff's medium. The tubes were inoculated from the untreated tissue and also from tissue macerated in physiological salt solution to which antiformin had been added. After 15 minutes the tubes were centrifuged, the antiformin solution was poured off, and the tubes were refilled with sterile salt solution and recentrifuged. This procedure was repeated three times. The culture tubes were inoculated from

the sediment. Check experiments on pure cultures of tubercle bacilli showed that the antiformin did not affect the viability of the organisms and that the medium was suitable for their growth.

A guinea pig was also inoculated with the tissue macerated in salt solution.

The 23 lesions examined were received from time to time between November, 1922, and April, 1923. The examination of 21 of these lesions was complete as detailed above. Two of the lesions were not injected into guinea pigs.

Most of the guinea pigs were killed in from 60 to 90 days after injection. In no case was any evidence of tuberculosis found in the experiment animals. No growth of acid-fast organisms was obtained on any of the cultures made from the 23 lesions. The microscopic examination revealed acid-fast bacilli in 7 of the 23 specimens. Large numbers were found in but one specimen. The results obtained from the examination of these lesions indicate that whatever may have been their cause, it could not have been the tubercle bacillus, for if this had been present we should have secured some evidence of it in the animals inoculated, or on the cultures made from the various lesions, certainly in those in which acid-fast bacilli were found microscopically. The experiment animals were not tested as to their sensitiveness to tuberculin.

Traum⁷ has reported the results of the examination of a number of lesions which were apparently similar to those which we examined. He was able to isolate an acid-fast organism from but one such lesion, in spite of repeated attempts. The others gave entirely negative results. The culture isolated when injected into cattle rendered about 50 per cent of them sensitive to tuberculin.

The following notes in regard to individual herds are of importance in the present connection. A herd of Holsteins had been tested a number of times previous to 1918 and no reactors had been found. In a test made in that year two gave suspicious reactions to the intradermal test, but did not react, eight months later, to the thermal test. In 1920 three reacted out of 63 tested with the thermal test; later in the same year one reacted to the ophthalmic test. In 1921 one reacted to the ophthalmic test, one to the thermal and one to both tests. In 1922 five reacted to the intradermal test. On a retest 16 months later one of these animals reacted to both the ophthalmic and intradermal tests. All three tests were used in the retest. On another herd-test in

1922 five more animals reacted to the intradermal test. In 1923, out of 74 animals, one reacted to the subcutaneous test and one to the subcutaneous and intradermal, both of which were used on the entire herd. Later in 1923, on a herd examination with the intradermal test, one gave a suspicious reaction but did not react on a later test.

All animals which gave positive reactions in the above test, extending over four and one-half years, were killed. No lesions were found in any case. It is to be noted that in 1922 approximately one-sixth of the herd was killed. No one can blame the owner of this herd for questioning the correctness of the test and for abandoning its use in the management of his herd, which he had reason to believe was free from tuberculosis, but which continually yielded reactors to the various tests.

The results of the tests made on another herd are as follows:

Test	Number Tested	Reactors
1st	32	0
2nd	31	0
3rd	34	2
4th	40	2
5th	38	5
6th	42	11
7th	44	0

Seventeen of the animals reacting on the fourth, fifth and sixth tests were segregated, and were shipped for slaughter in March, 1923, a date one to three years subsequent to the test at which they first reacted. Ten showed no lesions, and seven lesions of the skin only. One of the eighteen reacting at one of the three tests mentioned was slaughtered earlier, and was reported as showing lesions. We have no information as to the extent or location of the lesions.

In still another herd of valuable Guernsey cattle, which previous tests had shown to be free from tuberculosis, on a herd-test one reacted to the intradermal test and thirteen to the ophthalmic test. No lesions were found other than slight skin lesions in two animals.

The tests on all the above herds were made by various men, all experienced in the application and interpretation of the different tests. Their work can not be questioned.

The evidence above presented seems to us to point to the invasion of the tissues with an organism or organisms which can sensitize to tuberculin, which do not grow on the usual culture media employed for acid-fast bacilli, and which do not infect

experiment animals. The presence of acid-fast bacilli in some of the skin lesions may indicate, as would be expected, that members of this group are the casual agents in the sensitization to tuberculin in a part of the no-lesion and skin-lesion cases.

The entire question, as we have previously stated, deserves consideration from many points of view. We have thought it worth while to present the incomplete data in order that others may be led to investigate the cause of no-lesion and skin-lesion reacting cattle. The work is being continued in our laboratories as opportunity permits.

It seems to us very probable that in any area containing large numbers of cattle, reactors will continue to be found no matter how long testing may be carried on and how carefully the area is protected from reinfection with tuberculosis. It is desirable to have this idea proved or disproved as soon as possible in order that the farmers may know what to expect in the fight against tuberculosis. If, too often in the area movement to eradicate tuberculosis, reactors are found in which no evidence of tuberculosis can be demonstrated, the farmers in general, as some herd owners have done, may abandon the test.

As long as we adhere to the idea of the specificity of the tuberculin test, no satisfactory explanation to the farmer can be offered for no-lesion cattle. The recognition that there may be non-pathogenic acid-fast organisms which are able to invade the tissues, possibly when they have received mechanical* injury, may be of assistance in the eradication movement.

The farmer who is told that the tuberculin test has limitations in both directions, in not detecting the tuberculous animal and in indicating as tuberculous one that is not, is far more likely to be satisfied with results than when he is told that 99% of all reactors show lesions and that a herd from which the reactors have been removed is tuberculosis-free. Both such statements are still being made by veterinarians who write for publication and probably by those who do not.

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REPORT OF EXPERIMENTAL WORK TO DETERMINE WHETHER AVIAN TUBERCULOSIS IS TRANS- MITTED THROUGH THE EGGS OF TUBER- CULOUS FOWLS¹

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Avian tuberculosis is becoming more important not only because of the extent of the poultry industry but because of its relation to tuberculosis in other groups of animals. A knowledge of the means of dissemination of a disease is one of the basic principles which must be understood in the control of any infection. Avian tuberculosis has been generally understood to be transmitted largely through the droppings of infected fowls. Mention is made, however, in nearly all publications on this disease, of the eggs of infected hens as a means of spread. Van Es and Schalk state that "it seems thus that transmission by means of the eggs must be given consideration, although the data are not sufficiently numerous to enable us to correctly estimate the extent of the danger." Gallagher, in his bulletin, "Diseases of Poultry," reports that "the eggs of diseased birds frequently contain the microbes, and the young chicks hatched from such infected eggs are diseased when they leave the shell and soon infect the poultry with which they run."

The experimental work upon which these and similar statements are based is not extensive. Higgins, in Canada, reported that fifteen eggs were received at his laboratory from a flock of fowls in which tuberculosis had been previously diagnosed. Six of these eggs were used for microscopic examination and in three of them tubercle bacteria were demonstrated without difficulty. Eleven guinea pigs were inoculated with material from ten of the eggs (one only of the series used for microscopic examination is included in the inoculation experiments), with the result that, in two of these animals, unmistakable evidence of tuberculosis was found, after allowing a suitable incubation period to elapse. It is worthy of note that the fifteen eggs reported by Higgins did not come from known tuberculous fowls but from a flock in which the disease was present.

¹Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines, Iowa, August 19-22, 1924.

Mohler and Washburn examined two eggs from a known tuberculous hen. This hen came from Oregon. One of the eggs was perfectly normal in appearance but the other did not appear just right and, according to the authors, "would at once attract the attention of the poultryman because of its diminutive size and because its contour formed a perfect oval, neither end being materially broader than the other." Microscopic examination of these eggs failed to show the presence of tubercle bacteria. Inoculations intraperitoneally into guinea pigs, with the white and yolk, showed the presence of tubercle bacteria. The hen which laid these eggs was found, on autopsy, to be in good condition, her tissues being well covered with fat. The liver contained several tuberculous nodules. The intestines also showed numerous tuberculous nodules scattered over the surface. The mesentery also had many nodules. The membrane of the oviduct was inflamed two inches or more above its opening at the vent. The spleen, kidneys, and lungs were also markedly tuberculous.

Artault studied the changes and bacteria of the eggs of chickens. In addition to cultures, he made twenty-five inoculations of the contents of eggs into rabbits. In nearly all instances abscesses resulted, caused by white or yellow staphylococci. In one instance a lesion caused by a fungus was produced and in two cases tuberculosis developed in the rabbits. These inoculations were made deeply underneath the shoulder-blade. The eggs were old although the exact age he was not able to determine. They came from the vicinity of Halle, and he states that they were undoubtedly infected in the oviduct.

Gartner injected twelve female and one male canary bird intraperitoneally with a virulent culture of avian tubercle bacteria. From these he got nine eggs. These were injected intraperitoneally into guinea pigs and two were found infected. In a second experiment 25 canaries were injected and from these 24 eggs were received. Two of these by animal inoculation contained tubercle bacteria.

Koch and Rabinowitsch carried on some work in connection with artificially infected eggs. Thirty-two hen eggs were injected. Fourteen were infected with the avian type of germ, eleven with the human type, and seven with the bovine type. These eggs were then incubated and eight chicks hatched. Of these one had been inoculated with the avian strain, three with human and four with bovine. The one infected with the avian germ died at 75 days, with generalized tuberculosis. Those chicks

hatched from eggs injected with the human type were killed after 133 days and no trace of disease could be found. Of the four chicks from the bovine infected eggs one died at 33 days from extensive tuberculosis of the caeca. Two were killed and no lesions found. One was killed at 137 days and tuberculous lesions of the liver were noticed.

Baumgarten injected 12 eggs with a culture of the avian germ. Two only of these eggs hatched. One of the chicks died four months after hatching from generalized tuberculosis. The other died 4½ months after hatching and was found to be badly infested with tapeworms. A few lesions of tuberculosis were found in the peritoneum, liver and spleen.

Maffuci injected 18 hen eggs with a culture of avian tuberculosis. Eight chicks were hatched from these eggs. One of these chicks died 36 hours after hatching. No lesions were found on autopsy. Another died on the 20th day and tuberculosis was demonstrated microscopically in the liver. The third chick died on the 32nd and the fourth on the 40th day, in each of which tuberculosis was demonstrated microscopically. The fifth died on the fortieth day. This one was negative for tuberculosis. The sixth succumbed on the 47th day, the seventh on the 78th day and eighth at 4½ months. These were all tuberculous.

Milchner carried out an extensive series of experiments on artificially infected eggs and as a result of his work he concluded that chicks may be infected by expert artificial inoculation of eggs with avian tubercle bacteria but he is not sure whether natural infection occurs in this manner.

A careful study of the work heretofore carried out leaves one in doubt as to whether the transmission of tuberculosis through the eggs of tuberculous fowls is an important factor in the spread of the disease. In order to have available additional data the work here reported was carried out. Hens have been secured which reacted to the tuberculin test. These birds were leg-banded, confined, and trap-nested. A number of the hens secured did not produce eggs. The eggs have been examined by culture and inoculation methods.

After considerable experimentation we adopted the following technic for culturing eggs. The shells of the eggs were first carefully washed in sterile saline and then transferred to a 1-100 solution of bichlorid of mercury. They were allowed to remain in the solution for approximately one minute. They were then transferred to sterile water and dried with a sterile towel. The

eggs were then immediately taken up with a pair of pig obstetrical forceps and passed thoroughly through a Bunsen gas flame. All operations were carried out under sterile precautions and the workers wore rubber gloves. Two hundred fifty cubic centimeters of glycerin-beef infusion bouillon (pH. 7:2) was placed in a wide-mouth Erlenmyer flask and sterilized in the autoclave for twenty minutes. The mouth of the flask was flamed and the egg shell broken on it and the white and yolk of the egg dropped into the flask. The yolk was broken up with a sterile platinum loop. Some contaminations have resulted from this technic. The flasks were incubated at 37.5°C. for 6-8 weeks and then examined for the presence of acid-fast bacteria.

The eggs for inoculation into animals were prepared by washing the shells thoroughly and then breaking the white and yolk into a sterile casserole. Usually three eggs from the same hen were placed in a single container. They were then thoroughly beaten with a sterile egg-beater and from 20-30 cc of this mixture injected intraperitoneally into two chicks or hens. In the beginning we used a few guinea pigs and rabbits but abandoned these animals very soon for poultry, as the avian germ has greater pathogenicity for this group. All the poultry before inoculation had been previously tested with avian tuberculin. The birds are allowed to remain six to seven weeks after inoculation, then are tested with avian tuberculin. They are killed and carefully autopsied from one to two weeks after testing. We have examined 876 eggs from 43 hens. Nineteen additional hens were received in the experiment but died before they produced any eggs. Three hundred sixty-seven eggs were cultured and 509 were inoculated into poultry. As a result of this work we cannot recommend the culture method for the examination of eggs for tubercle bacteria. The eggs of certain hens seem to contain bacteria normally and some contaminations are sure to result from any culture method. Three flasks have shown acid-fast bacteria when examined. These were inoculated with eggs from three different hens (59, 1066, and 1094). These cultures have in turn been injected into chickens and in each case have failed to produce tuberculosis. As a result we cannot state that these acid-fast organisms were *Mycobacterium avium*.

Eggs from three of the hens studied were found to contain tubercle bacteria. These were hens E-288, D-128, and C-515. Only one bird out of four inoculated with eggs from C-515 reacted to the tuberculin test. On autopsy no evidence of disease

could be detected. Unfortunately C-515 died before further eggs were secured. Hen E-288 is very interesting. Two birds inoculated with her eggs developed tuberculosis. As stated before, the birds were inoculated in duplicate and two infected birds were in different groups inoculated with different eggs. One hen of each pair remained uninfected. This would indicate that only a very small number of germs were present in the eggs. The most interesting thing however was that on autopsy no evidence of tuberculosis could be found in the bird (E-288.) Both gross and microscopic examinations were employed. The hen however had been a consistent reactor to the tuberculin test. This would seem to indicate that the extent of disease does not determine whether the eggs contain the germs. Fifteen eggs from hen D-128 were injected. Both birds inoculated with the composite of three of these eggs were infected and the extent of the disease indicated that there were a considerable number of germs present in the eggs. All other inoculations with the remaining twelve eggs were negative. On autopsy D-128 showed extensive lesions of tuberculosis.

It will be noted from the table that two other hens besides E-288, mentioned above, failed to show lesions of tuberculosis on autopsy. These are hens 14 and 1096. Hen 14 reacted to the tuberculin test first Oct. 10, 1923. She gave her last distinctly positive reaction Dec. 12, 1923. This hen was tested several times during the interval from December to July but failed to give a distinctly positive reaction. Apparently the disease did not extend in this individual and finally became healed. Hen 1096 was tested first Apr. 26, 1923, and reacted. She again reacted Sept. 8, 1923. She was killed and autopsied Sept. 11, 1923, and failed to show either gross or microscopic lesions of tuberculosis.

SUMMARY

We do not believe, as a result of this work, that the egg is of any considerable significance in the transmission of avian tuberculosis. In all sixty-two hens were used. Only forty-three produced eggs. This would imply that about 30% of tuberculous hens, in all stages of the disease, do not produce eggs. A total of 876 eggs were examined, 367 by culture and 509 by inoculation. The germ of tuberculosis was found in the composite of nine eggs. This does not imply that all these nine eggs contained tubercle bacteria. They came from two different hens and only an occasional egg from these hens actually contained the germ.

TABLE I—Number of Eggs Cultured and Inoculated with the Results and Postmortem Findings

HEN	EGGS CULTURED	RESULTS OF CULTURES	EGGS INOCULATED	RESULTS OF INOCULATION	EGGS SECURED FOR STUDY DURING	DISPOSAL OF HEN WITH DATE AND AUTOPSY FINDINGS
C53	17	8 sterile 5 had moulds 4 had bacteria No acid-fast	10	No evidence of tuberculosis	August and December, 1923	Killed Dec. 31, 1923. Pea-sized tubercles seen in spleen
C69	17	11 sterile 6 had bacteria No acid-fast	10	No evidence of tuberculosis	August and December, 1923	Killed Dec. 31, 1923. Pea-sized tuberculous lesion in spleen
1073	10	3 sterile 2 had moulds 5 had bacteria No acid-fast	10	No evidence of tuberculosis	August, September, December, 1923	Killed Dec. 31, 1923. Two pea-sized tuberculous lesions in liver
1	8	1 sterile 7 had bacteria No acid-fast	13	No evidence of tuberculosis	May and June, 1924	Died June 8, 1924. A few tuberculous nodules on intestines
2	1	1 sterile	0		December, 1923	Died Feb. 13, 1924. Extensive generalized tuberculosis
3	4	4 sterile	0		December, 1923	Died April 16, 1924. Rupture of liver. Extensive tuberculosis of liver, also ribs and coxofemoral joint tubercular
6	1	1 sterile	0		December, 1923	Died April 16, 1924. Extensive tuberculosis of liver and intestines. Spleen slightly affected
9	3	3 sterile	3	No evidence of tuberculosis	December, 1923; January, 1924	Died April 12, 1924. Extensive tuberculosis of liver and spleen

TABLE I—(Continued)

HEN	EGGS CUL- TURED	RESULTS OF CULTURES	EGGS INOCU- LATED	RESULTS OF INOCULATION	EGGS SECURED FOR STUDY DURING	DISPOSAL OF HEN WITH DATE AND AUTOPSY FINDINGS
11	15	12 sterile 3 had bacteria No acid-fast	7	No evidence of tuber- culosis	November and December, 1923; January, 1924	Killed Dec. 31, 1923. General- ized tuberculosis of liver and intestines
12	3	3 sterile	3	No evidence of tuber- culosis	December, 1923	Died April 3, 1924. Extensive tuberculosis of liver, spleen, in- testines and kidneys
13	1	1 had coccus	0		November, 1923	Died Dec. 23, 1923. Tubercu- losis of liver and spleen, not extensive
14	11	8 sterile 3 had bacteria No acid-fast	13	No evidence of tuber- culosis	December, 1923; March, April, 1924	Killed July 15, 1924. No evi- dence of tuberculosis on autopsy
16	11	10 sterile 1 had bacteria No acid-fast	9	No evidence of tuber- culosis	December, 1923; January, 1924	Killed Jan. 12, 1924. Three tu- berculous nodules on intestines
17	13	11 sterile 2 had bacteria No acid-fast	11	No evidence of tuber- culosis	December, 1923; April, 1924	Killed July 15, 1924. A few small tuberculous nodules in the liver
19	10	4 sterile 6 had bacteria No acid-fast	11	No evidence of tuber- culosis	December, 1923; March, April, 1924	Killed July 15, 1924. Extensive generalized tuberculosis
20	13	11 sterile 1 had mould 1 had bacteria No acid-fast	9	No evidence of tuber- culosis	December, 1923; January, 1924	Killed Mar. 29, 1924. Tubercu- losis of the mesentery, not ex- tensive

TABLE I.—Number of Eggs Cultured and Inoculated with the Results and Postmortem Findings

HEN	EGGS CULTURED	RESULTS OF CULTURES	EGGS INOCULATED	RESULTS OF INOCULATION	EGGS SECURED FOR STUDY DURING	DISPOSAL OF HEN WITH DATE AND AUTOPSY FINDINGS
25	10	5 sterile 2 had mould 3 had bacteria No acid-fast	6	No evidence of tuberculosis	December, 1923	Killed Dec. 31, 1923. Extensive tuberculous of the liver
59	6	4 sterile 1 had bacteria 1 had acid-fast	28	No evidence of tuberculosis	May and June, 1924	Killed June 29, 1923. Small tuberculous lesion in liver
1054	4	4 sterile	17	No evidence of tuberculosis	May, June and August, 1923	Killed Oct. 11, 1923. Tuberculous of liver, spleen, and intestines
1056	5	5 sterile 1 had mould	24	No evidence of tuberculosis	May and June, 1923	Killed June 29, 1923. Extensive tuberculous of liver and cloaca
1057	4	2 sterile 2 had bacteria No acid-fast	12	No evidence of tuberculosis	May and June, 1923	Killed Oct. 11, 1923. Extensive tuberculous of liver, spleen and intestines
1066	7	5 sterile 1 had bacteria 1 had acid-fast	26	No evidence of tuberculosis	May and June, 1923	Killed June 29, 1923. Liver mildly tuberculous. Intestines badly tuberculous.
1072	15	10 sterile 5 had bacteria No acid-fast	17	No evidence of tuberculosis	June, August and September, 1923	Killed Oct. 11, 1923. Slight tuberculous of liver and spleen
1076	11	6 sterile 4 had bacteria 1 had mould No acid-fast	23	No evidence of tuberculosis	May, June, August and September, 1923	Killed Oct. 11, 1923. Very slight tuberculous of the liver
1083	3	1 sterile 2 had bacteria No acid-fast	27	No evidence of tuberculosis	May and June, 1923	Killed June 26, 1923. Extensive tuberculous of caeca

TABLE I—(Continued)

HEN	EGGS CUL- TURED	RESULTS OF CULTURES	EGGS INOCU- LATED	RESULTS OF INOCULATION	EGGS SECURED FOR STUDY DURING	DISPOSAL OF HEN WITH DATE AND AUTOPSY FINDINGS
1087	7	3 sterile 4 had bacteria No acid-fast	18	No evidence of tuber- culosis	May, June and July, 1923	Died July 18, 1923. Extensive tuberculosis of liver, spleen, and intestines
1090	3	3 sterile	29	No evidence of tuber- culosis	May and June, 1923	Killed June 26, 1923. Tubercu- losis of liver, moderate
1094	5	3 sterile 1 had bacteria 1 had acid-fast	12	No evidence of tuber- culosis	May and June, 1923	Died July 12, 1923. Extensive generalized tuberculosis
1095	18	8 sterile 10 had bacteria No acid-fast	16	No evidence of tuber- culosis	May, August and September, 1923	Killed Oct. 11, 1923. Slight tuberculosis of liver and caeca
1096	8	7 sterile 1 had bacteria No acid-fast	27	No evidence of tuber- culosis	May, June, July and August, 1923	Killed Sept. 11, 1923. Reacted to tuberculin Sept. 8, 1923. No lesions of tuberculosis were found
C779	13	11 sterile 2 had bacteria No acid-fast	9	No evidence of tuber- culosis	February and March, 1924	Killed July 15, 1924. Small, heavily-walled (3m. m.) tuber- culous lesion in mesentery
A488	11	9 sterile 2 had bacteria No acid-fast	9	No evidence of tuber- culosis	March and April, 1924	Killed July 15, 1924. Tubercu- losis of liver and spleen, medium
D105	11	11 sterile	9	No evidence of tuber- culosis	March and April, 1924	Killed July 15, 1924. Large (1 c.m.) tuberculous nodule on cloaca
C772	13	11 sterile 2 had bacteria No acid-fast	12	No evidence of tuber- culosis	April and May, 1924	Killed July 15, 1924. One small (1 m.m.) lesion of liver

TABLE I.—*Number of Eggs Cultured and Inoculated with the Results and Postmortem Findings*

HEN	EGGS CULTURED	RESULTS OF CULTURES	EGGS INOCULATED	RESULTS OF INOCULATION	EGGS SECURED FOR STUDY DURING	DISPOSAL OF HEN WITH DATE AND AUTOPSY FINDINGS
E288	13	9 sterile 2 had bacteria 1 had mould No acid-fast	15	Two birds showed evidence of tuberculosis. Others negative	March, April, May and June, 1924	Killed July 15, 1924. No evidence of tuberculosis found
D128	15	11 sterile 1 had mould 3 had bacteria No acid-fast	15	Two birds showed tuberculosis. Others negative	March, April, May and June, 1924	Killed July 15, 1924. Extensive tuberculosis of intestines and spleen
C515	1	1 had bacteria No acid-fast	6	1 bird reacted to test. No tuberculosis on autopsy. Other birds negative	March and April, 1924	Died Apr. 24, 1924. Extensive tuberculosis of intestines and cloaca
B91	9	6 sterile 2 had bacteria No acid-fast	12	No evidence of tuberculosis	April, May and June, 1924	Killed July 15, 1924. Extensive tuberculosis of liver. Spleen and kidney tuberculous
234	15	8 sterile 6 had bacteria 1 had mould No acid-fast	13	No evidence of tuberculosis	April, May and June, 1924	Killed July 15, 1924. Generalized tuberculosis of liver
C794	0		1	No evidence of tuberculosis	June, 1924	Killed July 15, 1924. Liver, spleen and intestines extensively involved
27	6	6 sterile 2 had bacteria No acid-fast	5	No evidence of tuberculosis	June and July, 1924	Killed July 17, 1924. Small (4 m.m.) tuberculous lesion in liver
29	4	2 sterile 1 had bacteria No acid-fast	6	No evidence of tuberculosis	June and July, 1924	Killed July 17, 1924. Small (2 m.m.) tuberculous lesion in liver
30	11	8 sterile 3 had bacteria No acid-fast	6	No evidence of tuberculosis	June and July, 1924	Killed July 17, 1924. Tuberculous nodules throughout intestines
Total	367		509			

It would be safe to conclude from these results that less than 1% of eggs from tuberculous fowls actually contain living tubercle bacteria. It has been shown, however, that chicks may be hatched from artificially infected eggs and it is possible that a naturally infected egg might hatch and the chick itself be actually tuberculous. The possibility of this actually occurring under field conditions and, further, that it would result in the active spread of disease is quite remote.

Another phase which we have investigated is the dissemination of avian tuberculosis through the egg shells becoming soiled with feces containing the tubercle germ. We have examined the shells of 209 eggs coming from known tuberculous birds. The eggs have been carefully washed in sterile saline. The saline was centrifuged and the sediment injected interperitoneally into poultry. Much to our surprise we have never produced tuberculosis in any of the inoculated birds. This method of dissemination also does not seem significant.

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DISCUSSION

CHAIRMAN KERKAMP: Dr. Fitch has just read a very interesting paper, and I know personally that it represents a lot of work. It has helped to settle a problem that frequently comes to us. I hope that we may have an interesting discussion of it.

DR. L. W. GOSS: I don't know that I ought to discuss the paper, but I would like to know something of the method of taking the material from the eggs, the approximate quantity of these eggs, were the whites and yolks beaten, and what percentage of the egg was used for the inoculation.

DR. FITCH: The way we did it was like this: The whole egg was cultured and three eggs were broken into a sterile casserole, beaten up, and from twenty to thirty cubic centimeters of this beaten mixture was inoculated intraperitoneally in the birds.

DR. GOSS: Was there evidence of tuberculosis in the peritoneum?

DR. FITCH: There was no tuberculosis of the peritoneum in any instance. Here is one of them, an extensive tuberculosis of the intestines, peritoneum and spleen,—no evidence of tuberculosis of liver, ovary, or any other organ. The other one showed no evidence of tuberculosis on autopsy.

THE WHYS OF TUBERCULIN TEST FAILURES¹

By DR. GEO. E. CORWIN, *Hartford, Connecticut.*

Deputy Commissioner on Domestic Animals.

It might appear, from the subject which I have chosen, that my object was to inspire reflections upon the efficiency of the tuberculin test. The mere fact that even the failures could be commented upon may bring forth a fury from those who are well acquainted with tuberculin and its usefulness and efficiency as a diagnostic agent in detecting tuberculosis in all its failures and revealing its presence in one or more lodging points in the animal body. It is not my intent, in any discussion of this paper, that this view should be taken. In featuring this point, I will state that I do not believe there is a more accurate means of detecting disease by any agent in any disease, either in veterinary or human medicine, than tuberculin in detecting tuberculosis. It is not infallible, but the percentage of accuracy is so high in the phenomena of reactions, as related to tuberculous animals, that it brings forth the question—Why any failures?

We have often found ourselves trying to solve some of the many whys, and perhaps the first one would be—why do we get a reaction at all? The answer, or the probable reason, we assume to be one of the several hypotheses as set forth in a text-book or as given by a student of this form of phenomenon. We select the one which appeals to our imagination and rely upon it for our store of knowledge.

We have failures in the detection of tuberculosis by the use of tuberculin and again we ask why. The pages of our text-book are turned again to seek out the reasons of these apparently uncalled-for failures. What information do we glean on this point from our book investigation? We had noted that a reaction was due to a phenomenon of allergy or anaphylaxis and hypersusceptibility. Now, if a reaction is due to one or more of the above conditions, the non-reaction of diseased animals must be due to the reverse condition, but on further investigation we also find that a non-reaction may also be due to the fact that a badly diseased animal or a generalized case may be immune, or no longer sensitive to the action of tuberculin.

¹Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines, Iowa, August 19-22, 1924.

Going further we again note: Why do some generalized cases of tuberculosis react to the application of tuberculin in one manner and not another? If the cause of non-reactions in generalized tuberculosis is due to immunity or anti-anaphylaxis, then it must be possible that, in a badly diseased condition, this immunity is one of a passive nature, and the reason for reaction to one test and not to the other is due absolutely to the state or condition within the animal body at the time the test was applied.

Complications as regards tendencies or non-tendencies of tuberculous animals to react to the application of tuberculin did not appeal to us so strongly until after the advent of the intradermal and ophthalmic tests, although it was well understood that all tuberculous animals did not react or reactions were not observed when administered subcutaneously. Since the three tests have been used, enabling us to check one with another, many startling conditions have been brought to light and I think the most important one is: Why do some tuberculous animals react to one test and not to another?

If a tuberculous animal does not react to a subcutaneous test, or an ophthalmic test, why does it react to an intradermal, and again why does a tuberculous animal react to an intradermal test and give absolutely no indications of a reaction to the ophthalmic or subcutaneous? We also have in mind that, at times, generalized cases do not react to any of the tests, while at some time in the future they may and still be generalized cases. I have tried to believe that when tuberculous animals are generalized cases, showing a reaction to the intradermal or ophthalmic test, which have not responded to the subcutaneous, it was due entirely to the fact that the skin and mucous membrane of a tuberculous animal were much more sensitive to the action of tuberculin and showed in a more exemplary manner than the subcutaneous-thermic. I believe this to be true to a certain extent, but when we note that even these two methods have apparently failed in some cases of generalized tuberculosis, we have another why.

The more pronounced reactions to tuberculin are presented by animals in the active stage of tuberculosis, or when the lesion is in a caseous condition. I even believe that our more pronounced reactions (intradermal) are presented when an infected animal reacts and no visible pathological lesion can be found. I also know that when the tuberculous condition is in a calcified state or when an animal is a generalized case, that a response to the

action of tuberculin is not so pronounced; neither does it appear as quickly.

Experience has taught that some of the failures of the tuberculin test are directly caused by the human element of the test and the human failures can be connected and applied to all three methods. I enumerate the human elements as reliability of tuberculin, adaptability and experience of the operator, technic, resourcefulness, and determination.

The failure to account for a reaction in the subcutaneous test might be due to a subnormal "post" temperature or an abnormal "pre" temperature, or failure to observe a systemic or physical reaction without thermal changes.

In observing and recording the intradermal test, one may feel unwarranted in pronouncing a slight reaction as positive, but this slight reaction, especially in a badly infected herd, may be found to be a generalized case of tuberculosis.

A reactor may develop at a later hour and go unobserved. Many cases have come to my attention—and this is worthy of note—where an animal has given a slight positive reaction at the first observation, or 72nd hour, and at the time of the second observation, about the 120th hour, this slight reaction has entirely disappeared and the second reading is recorded as negative, the animal being passed as healthy. These animals have been killed shortly after the test for one reason or another and, in many instances, the percentage is too large of those that have been found to be badly diseased or generalized cases of tuberculosis. I call your attention to this specifically, for the reason that I wish especially to show that one should be extremely careful with slight reactions, but that the failure in this specific instance has been due, not to the action of tuberculin, but to that part of the test which is called the human element.

In noting the failures of the ophthalmic test, we have also noted that many of its failures are due entirely to the human element of the test, and that due to lack of proper attention to the test, either in the manner of application or in that part of the test where the human element is concerned, that many mistakes have been made as regards the recording and observing of the action of this test.

In concluding my remarks in this paper, I wish emphatically to state that, with everything taken into consideration, the tuberculin test, if properly applied, would be much more accurate than it now appears to be and that many of the so-called failures

could be corrected. With the opportunity now before us for the scientific study of tuberculosis and its detection, it would also appear that many of the complications brought to us by the seeming failures of tuberculin to cause reactions in tuberculous animals might be studied more closely and a very fair and accurate knowledge gained of the reasons for its failure at all.

DISCUSSION

(See discussion of Dr. Lowrey's paper, page 63.)

LOST

Below is given a list of members of our Association for whom we have no correct addresses. First-class mail, sent to these members at the addresses given after their names, has been returned by the post office, undelivered. The Secretary will be very glad if any of our members can furnish correct addresses for any of these men.

Barr, A. C., 5534 Campbell St., Kansas City, Mo.
Bourland, C. C., Army Medical School, Washington, D. C.
Burns, J. R., 920 Market St., Shreveport, La.
Cummins, W. M., P. O. Box 504, Eagle Pass, Texas.
Eschenbacher, A. B., Gen. Del., Denver, Colo.
Evans, A. V., Goodland, Kans.
Faires, O. K., 423 N. 11th St., E. St. Louis, Ill.
Gilgen, F., Box 92, Eaton, Colo.
Gillespie, Andrew, Marlow, Okla.
Hart, C. E., 609 Archibald, Kansas City, Mo.
Hart, W. G., Box 338, Sacramento, Cal.
Herbott, W. K., Fort Sheridan, Ill.
Hobdy, W. M., Box 222, Chickasha, Okla.
Jaquiss, W. A., 1101 Westlake Ave. N., Seattle, Wash.
Lovell, Roy, San Ysidro, Calif.
Ludwig, H. T., 1536 Lloyd St., Louisville, Ky.
Magill, A. B., 315 W. 22nd St., Oklahoma City, Okla.
Martin, A. D., Office of Sta. Vet., Fort Niagara, N. Y.
Merchant, E. S. D., Coll. of Vet. Sci., Univ. of Philippines, Manila, P. I.
Miller, M. W., Delmar Hotel, Gallup, N. Mex.
Mitchell, J. J., Dept. of Agri., Lansing, Mich.
Peterson, W. C., c/o B. A. I., Cedar Rapids, Iowa.
Riddell, R., 460 Chester St., Victoria, B. C.
Rosenberger, G. W., 1035 W. French St., San Antonio, Texas.
Roycroft, W. C., 358 N. Royal St., Mobile, Ala.
Scheloski, C. M., 1118 Riverview Ave., Kansas City, Kans.
Seligman, Arthur, 509 Boston Bldg., Salt Lake City, Utah.
Smith, H. C., New Hampton, Iowa.
Smith, L. R., 2836 Forest Ave., Kansas City, Mo.
Stuck, D. R., 6028 So. May St., Chicago, Ill.
Thompson, Wm. A., Elmvale, Ont., Canada.
Welf, O. H., Herald Ave., Mantua, Ohio.
Whalen, J. H., 3816 W. 61st St., Chicago, Ill.
Wisner, B. S., Omega, Nebr.

DISINFECTION OF PREMISES IN CONNECTION WITH THE ERADICATION OF TUBERCULOSIS¹

By J. A. BARGER, *Des Moines, Iowa*

*B. A. I. Inspector in charge of Tuberculosis Eradication Work in
Iowa*

Disinfection is the destruction of the agents causing infection. Natural disinfectants are: sunlight, dryness, time, antibiosis and symbiosis.

Most pathogenic organisms do not multiply if exposed to sunlight and some, including the tubercle bacilli, die very quickly. Diffuse light is also very destructive to them, but sunlight is Nature's most effective disinfectant. Most germs thrive in moist media, but many die on exposure to dryness.

Time is of much importance and must be given consideration in connection with diffuse light and dryness. Even chemical agents require time. Some germs are attacked by saprophytic organisms and killed, while others live together to the advantage of both, but this factor is not of practical importance in tuberculosis work.

Among physical or artificial agents of disinfection are: heat (dry or moist), fumigation, chemicals, such as phenol, cresol, chlorid of lime, and many other similar substances. Live steam and hot water are very effective for most work, but rarely are available. Hot water has the added quality of diluting the infection. Thorough cleaning destroys some germs by removal.

The value of fumigation is quite limited in connection with tuberculosis eradication work, and it may give a false sense of security—other methods of disinfection are usually more appropriate

Chemical agents are, with rare exceptions, an absolute necessity in the disinfection of premises. But only chemicals of known strength should be employed and due regard should be given to the extent of the dilution. The percentage of reduction is usually given on the containers of approved disinfectants.

When lime is used with a solution of phenol or cresol, it should not be in excess of one and one-half pounds to the gallon, and the lime should be fresh water-slack, in which form it has some germicidal value itself.

¹Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines Iowa, August 19-22, 1924.

Lime with cresol has about one-half the germicidal action of the combined substances, for lime neutralizes soaps of the compound cresol and forms a sticky, inert mass which may defeat the purpose for which it is used.

Chlorid of lime is of great value in disinfecting wet lots or runways of cattle leading to barns, in which case it can be used dry and applied with a lime spreader or by suspending a burlap sack partly filled with lime from the center of a ten- or twelve-foot pole. Two men can disinfect a large area in a short time in this way.

There is nothing new that I know about in the matter of disinfection.

The fact that sunlight, dryness and time are potential factors in this respect, and that running streams purge themselves of most bacteria in a short distance, or that the infection in the water becomes so diluted that its danger is negligible, is no truer now than many years ago.

The trouble with most of us and the point that I should like to emphasize is the necessity of having the efficiency of these things so well fixed in our minds that we will be able to convince the owners of infected premises of the wisdom of giving these natural disinfectants an opportunity of functioning and supplementing them with whatever artificial disinfectants that are necessary to complete the job.

Cleanliness, fresh air and sunlight are of first importance in any clean-up job, for it is obvious that no infected premises can be disinfected until cleaning has been done sufficiently to expose the places which it is desired to disinfect.

Evidence of the value of sanitary measures is seen in the comparison of the retests of a veterinarian who always urges the invocation of these measures with the work of others who are inclined to feel that their duty ceases when they have tagged and branded the reactors.

Some veterinarians have no trouble ordinarily in persuading an owner to make windows in the sides or roof of his infected barn when he has been shown that the rays of the sun will fall in a dark and damp place, should the windows be made in a certain spot.

It is a fact that, as aforesaid, sunlight and the process of drying are elements under which few pathogenic germs multiply and many of them are destroyed by the former in a period of a few minutes, but in order to bring about the exposure of these organ-

isms to either the sun or artificial disinfectants it is necessary to clean infected structures scrupulously and remove all manure and trash from the premises.

It is interesting to note that while 25% of the second tests of infected herds reveal reactors in accredited-herd work, only about 12% of the infected herds are found infected on the second test in area work.

Inasmuch as cattle may harbor the germ for some time before the disease is produced, it can not be expected that a system of testing can be so perfect and the disinfecting be so complete that no reactors will be found on retest work, but the reduction in the percentage of infection found on the retests in area work just referred to is attributed to the fact that the inspectors have been more closely in touch with their work and have been able to obtain a more strict compliance with the requirements for disinfecting.

DISCUSSION

(See discussion of Dr. Lowrey's paper, page 63.)

CONVENTION NOTES

Dr. C. H. Case, of Akron, Ohio, recently wrote: "I certainly enjoyed the meeting at Des Moines, and especially the last day, at the clinic. It was worth the total cost of the trip."

Among the visitors at Des Moines was Dr. Erik Birger Jonsson-Rosio, of Stinal, Sweden, a graduate of the Royal Agricultural College of Sweden (1915) and of the Royal Veterinary College of Sweden (1920). Dr. Rosio is a district veterinarian of Sweden, and is spending about five months in the United States studying animal husbandry, under the auspices of the Swedish-American Foundation of Stockholm and New York.

The following participated in the alumni dinner of the New York-American Veterinary College, at the Fort Des Moines Hotel, Tuesday evening: Drs. Otto Faust ('88), of Poughkeepsie, N. Y.; W. H. Kelly ('89), of Albany, N. Y.; E. N. Stout ('91) and wife, of Denver, Colo.; I. K. Atherton ('93), of College Park, Md.; J. A. Kiernan ('94), of Washington, D. C.; J. T. Glennon ('96), of Newark, N. J.; Thos. E. Smith ('97), of Jersey City, N. J.; and Adolph Eichhorn ('00), of Pearl River, N. Y.

NOTES ON POSTMORTEM METHODS IN CATTLE REACTING TO TUBERCULIN¹

By F. H. S. LOWREY, *Ottawa, Canada.*

Eastern Division Supervisor, Meat and Canned Foods Act.

The examination, to be one hundred per cent accurate, taxes the skill of the veterinarian and rightly so. The operator must be up-to-date, know his anatomy, have keen eyesight and, last but not least, determine at a glance the appearance of the abnormal from the normal.

The ideal conditions to work under are: an animal that has been rested, fasted, properly bled and presented on a floor well lighted (preferably natural light), with a room temperature that will permit the best possible work. In this respect we too often fall short.

To be at his best, the operator must be provided with a sharp, keen-edged knife and be capable of keeping it in proper condition. This, at first thought, may seem superfluous but has marked advantages in order to incise and examine a lymph gland or organ properly. The operator, too, must dress for the occasion—suitable clothing with short sleeves—and one must ever be provided with sterilizing equipment suitable for saw and knife. Proper washing equipment for the hands is also a requisite.

Knowing the peculiarity of lymph glands—that they may spring up wherever needed—the eye must travel fast and of necessity be accurate. Quite true there are certain lymph glands that are always present, but they vary as to size, color, etc. In old animals they are usually dark and often indurated, while in young animals they are much the reverse. Some knowledge of a normal lymph gland and at the same time the age of the animal, whether young or old, must be considered.

It is quite generally accepted and should be borne in mind that tuberculous infection in submaxillary and mesenteric glands is rare in adult cattle. More often the retropharyngeal, bronchial and mediastinal glands, together with lung and liver lesions, are more commonly found infected in aged cattle. In younger animals the infection is more often through the alimentary tract.

The routine of examination on the slaughtering floor is largely as follows: First, the identification of the animal is recorded,

¹Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines Iowa, August 19-22, 1924.

and every precaution taken that all parts of the carcass and viscera remain accurately identified until the finish. The head is severed from the carcass and after washing and flushing of the nose, mouth and throat, the submaxillary, retropharyngeal, atlantoid, parotid, and upper cervical glands are incised and examined, tongue palpated and any erosions examined.

The tonsils are examined and removed. When the carcass reaches the half-hoist and the rump is skinned down, the popliteal gland is best examined and, immediately after, the muscles should be skewered. The viscera are next presented, mesenteric, portal, right and left bronchial, anterior and posterior mediastinal glands are to be dealt with. Surfaces of liver and spleen closely examined (spleen to be removed for this), and a most careful examination of the lung substance, both palpation and observation. Surfaces of the paunch closely scrutinized, as lymph glands are often observed. A well-marked lymph gland is often present, imbedded in fat under the spleen.

The udder is best examined after complete removal from the carcass and, if it is an aged cow, this organ requires time to be incised and palpated thoroughly. Then follows the hide. This must of necessity be accomplished by palpation and observation, as cutting would be disastrous.

The operator's attention is next directed to the dressed carcass which we will assume has been split down, the half-side is turned to provide the best possible light and the operator works from above downwards. Superficial and deep inguinals, iliaes, ischiaes, precrurals, sublumbars, renals, prepectorals, prescapulars, bronchials, and lower and middle cervical glands are to be incised and examined, kidneys longitudinally incised and immediately pressed together, surfaces of pleura and peritoneum carefully looked over and skirts of diaphragm to be well lifted and surfaces observed. A well-marked lymph gland imbedded in fat on the sternum, at the anterior end of the diaphragm, has often been observed by the writer. Observe the pleural cavity for broken ribs which may carry a tuberculous infection. All cut surfaces of bones to be observed and outer surface of carcass looked over for lymph glands which are often well developed.

Should it so happen—and occasionally it does—that the operator has reached this stage and discovered no lesions, he must again turn his attention to head, viscera, hide, and carcass and repeat.

Permit me here to make mention of some conditions that are likely to be confused with tuberculosis, and this fact should be borne in mind by every operator.

(1) Actinomycosis, more often met in head, tongue, and thoracic viscera.

(2) Parasitic lesions in lymph glands, liver and serous membranes, particularly the one often seen on the peritoneum, which is pedunculated, and known as the *Setaria labiata-papillosa*.

(3) Tumors, both epithelial and connective tissue.

Every veterinarian should guard against unnecessarily opening tuberculous lesions, and every precaution should be taken to conserve and avoid any unnecessary mutilating of the carcass, all of which retards the work, as the owner in every instance must settle. The bronchial gland can be reached between the first and second ribs and thus avoid cutting in on the outside of the carcass. The opening made to examine the popliteal gland can be nicely closed by skewering, if done immediately the gland is examined. It should be skewered from inside out.

The huge task of eradicating tuberculosis in cattle is one that can be accomplished only by careful, steady efforts and no detail in connection therewith is too small to be of no value. The owner of the stock is, and rightly so, the most interested party and no effort on the part of the veterinarian to demonstrate the disease, in the animal that has reacted, is to be overlooked. Quite true, the animal that has become generally infected, and in which the disease is of long standing, is the most spectacular to the eye, by this type is the exception, and the owner should be educated to this.

Every effort should be put forth by veterinarians to have the fullest confidence between the operator who has made the test, and the operator who performs the autopsy, as in no other way can we have permanent success, and the goodwill and confidence of stock owners be maintained. Let us be content with careful, slow-going but accurate movements and every veterinarian play his part.

DISCUSSION

DR. C. H. CASE: We disinfect barns with liquor cresolis and go over them carefully, especially in the winter time, when we cannot keep the cows out very long. About two days after the milk is sent to market, it is sent back and they say, "You have carbolic acid in the milk." It means a great loss to a man who has six or eight cans of milk thrown out. Of course, we know that we get results. We can get better results in the summer time, when they milk the cows in the barnyard, but when they do the milking in the barn, they take the milk out immediately. But I wonder if we could not use chlorin more—for disinfecting. I know that in certain dairies they have a machine

with which they can make their own—"B.K." as they call it—and disinfect the barn regularly twice a week. I wonder if that could not be used. I would like to know, because it will save so much money for the dairyman.

DR. BARGER: Chlorid of lime is a hard thing to get out of the barn. The odor remains for a long, long time. It is best for outside, in disinfecting wet places. When a cresol disinfectant can not be used, then I would suggest that you thoroughly clean by the use of hot water or steam. In that instance, you could re-clean in a period of three or four days, and the dilution that takes place makes it almost impossible for the cattle to pick up any germs, for they would be carried off into the streams. We know that rivers and streams purge themselves, in a certain distance, of most pathogenic bacteria, the germs being so diluted that the probability of infecting anything is slight. But if you could not do any of these things, it would seem that the cows could be milked outside of the place recently disinfected, and in that way avoid any odor of the disinfectant getting into the milk. There are quite a number of ways that you can do it, if you will just give it a little thought.

DR. J. B. HOLLINGSWORTH: In connection with the milk taking on the odor from the disinfectant, I might say that in our district we have a man who is doing practically nothing else all summer, and he uses a preparation, along with the lime-wash, to disinfect stables. The stable smells pretty strong, but we do not allow the man to handle the milk at all in the stable. He removes it immediately from the stable, and I have not had one complaint of the milk having odors.

DR. C. E. COTTON: Do not overlook the importance of cleaning first. I am satisfied that if you do a thorough job of cleaning, the disinfection is of minor importance. If you put forth a real effort in scraping and cleaning, using lye and hot water, and scrubbing, you will destroy a large part of the infection, and then it will not be necessary to advise the farmer to take a force-pump and use a three per cent solution of liquor cresolis to flood the stable, and thus allow the cows' bags and tails to become saturated. Warn them to take the milk out of the stable immediately, for the separating process, and then have the man use a little bit of common sense prior to milking, and you will get away with a great deal of the smell.

DR. A. T. KINSLEY: Relative to disinfecting and cleaning, the cleaning is probably ninety or ninety-five per cent of the disinfection of any barn. If the barn is not thoroughly cleaned you can apply practically any disinfectant with but very little efficiency, and I wonder why it would not be as effective after a thorough cleaning, to use the old whitewash-bichlorid spray. What has not been removed by the cleansing will be held in contact and the virulence of any infecting organism will be diminished, not only through the agency of the lime, but through the bichlorid.

DR. CASE: Just one word about that. It is all right to talk about cleaning the barn, but in the winter time you can not turn the cows out for one half-day. I would like to get hold of a disinfectant that will not hurt the milk. I cannot agree with some of the statements that have been made. We take the milk out just as quickly as we can, but it comes back to the dairyman just the same. Anybody in my district will tell you the same thing.

DR. J. I. GIBSON: I want to second most of what Dr. Kinsley said, but I think that we might issue a warning about the free use of bichlorid in disinfecting mangers and feed-boxes, as there is a danger of mercurial poisoning.

I thoroughly agree with what has been said about the importance of thorough cleansing—cleaning, brushing with hot water and lye—and I would not care if we went no further than that in my barn. I think that would be sufficient. That has all been proved in surgery, if you look at the history of surgery. I remember when each of the best human surgeons in the country had a favorite antiseptic solution for operating. We saw the time when they used no other agent but common salt solution or sterile water. So we cannot overemphasize, in my judgment, the importance of cleaning and the slight necessity for great quantities of disinfectants and especially one so poisonous as bichlorid.

DR. ROBINSON: I just want to cite an experience. I have not been highly satisfied with my work in some lines. I refer to a couple of cows which I

tested and I got little shot-like lumps in the caudal fold and I got no reaction whatever in the vulva. I kept those cows as suspects and in thirty days I tested them with the ophthalmic test and got no reaction whatever. The part with which I am not satisfied is that I do not just know which ones to knock down. Possibly that was brought out in the first paper; I did not hear it, but I would like to have somebody tell me.

DR. J. H. McLEOD: How large were they?

DR. ROBINSON: The lumps were very small; possibly the size of BB shot.

DR. M. H. REYNOLDS: I think that the gentleman who obtained those little shot-like lumps in the skin may rest his soul in peace and security, because those slight indurations in the skin, after repeated injections, are not uncommon at all in perfectly normal cattle.

There were quite a number of points in Dr. Corwin's paper which, it seems to me, should have some discussion here. Of course, there is a perfectly plain "why" for every tuberculin failure. The only trouble is that we have not been able to get hold of the whys and be able to classify and define them.

With reference to the use of the double intradermal test, referred to in the first paper, one being a check on the other, the doctor feeling that when he had a very slight intradermal in the caudal fold and a somewhat more positive or decided reaction in the vulva, it was a very useful and helpful prop.

I have a very strong suspicion that quite a number of so-called "non-intradermal" reactions are merely intradermal reactions that were overlooked or reactions which the operator did not have quite enough nerve to condemn. It is my experience that all three tests agree with startling unanimity in non-tuberculous herds; where there is no reasonable probability of tuberculosis, all three tests agree very, very closely in a unanimous negative.

DR. W. E. COTTON: A case came under our observation only a short time ago. A pure-bred Holstein gave a negative test, and then some reaction on the next test. In looking around for the source of infection, they remembered there was one animal that gave a doubtful reaction. She was subsequently tested and then gave a negative reaction, and she was left in the herd. After they got these reactors, they killed the animal and found a case of tuberculosis. She evidently was responsible for the infection of the animals, and the owner made up his mind that after that all doubtful cases would be treated as though they were positive.

DR. BARGE: It is a good thing to draw the line pretty closely. In over 2000 reactors, we left only about twelve suspicious animals. Every one realizes the importance of cleaning up the first time. There is no harm in taking out what might appear to be a reactor when you have other reactors in the herd, or something to justify it. I think that that is being done more and more all the time. When a veterinarian nowadays finds many reactors, he interprets the tests a little bit differently than he has before, and that shows the wisdom of the double injection.

We may say that we can go out and use a man's herd in any sort of way, and have the man subscribe to what we have been doing, but this intradermal reaction is something that one can often see. I don't mean to say that a layman can see it as well as a veterinarian, but you can justify your action in the mind of the man who is losing the cattle.

In the matter of disinfecting, I know that there is no veterinarian here who would undertake to disinfect the premises until he had got them clean, where he could apply the lye and disinfectant. You all realize that the place has to be disinfected. That is a big part of the job; and you can't disinfect until you get down to where the place is, that is to be disinfected. If there is one-half, one-quarter, or one-eighth inch of slime dried on the floor or the manger you know that as soon as it is a little wet on top there is going to be exposure. We do not think of the disinfectant until the place has been cleaned, as Dr. Cotton and Dr. Kinsley said.

The question has been brought up about leaving odors in the milk. That is the thing which we must find out about. It is the choice of two evils, and if it means the contamination of milk for a very, very short time, we must do it.

DR. GIBSON: May I ask you a question? How do you remove the slime from the mangers and feed-boxes?

DR. BARGER: It is removed with a hoe that has been flattened out like a shovel, with a wire brush, or scrubbing apparatus; they wet it and then come back in a couple of hours and it can be removed. Apply water pressure if you have it, or do the best you can. We just have to use the instruments which we have. We go to places where there are no floors, and we just have to go ahead and clean them out. You have to have some rays of the sun, too. You cannot clean out moldy places, and do a good job, unless you use some disinfectant.

You have to be resourceful, and know the people with whom you are dealing; what they will do and why they will do it. We find that it all depends upon the man himself. For instance, we have different data and the only way in the final analysis to tell if you did a good job is to put on another test; put on a retest and you will have a better idea. In some cases where the men believe in the necessity of proper cleaning and following with disinfectant, it doesn't hurt to put on a little disinfectant. You will find that the fellows who believe in getting it done will probably have twenty-five or thirty per cent less reactors on their second test, than the fellows who say, "Get the reactor out, and clean up and spread a little lime around."

You have seen "Sidelights on Tuberculosis." If I am not mistaken, throughout the United States there has been in the last several years about one out of every four herds infected on the first test, and reactors on the second test. In our area where we test generally and possibly we do not find as many highly infected premises. It is true that we have cut the percentage in two. I don't believe that is because we have been putting on the double injection. It is true we have been using it more than we used to, but I believe it is because the men believe in cleaning and disinfecting the premises. As we go on, the men who are not doing it will see what is being done by the sanitarians and they will come to it. It is not what you and I do, but it is what we get the owner of the cattle to do when we leave, and how much we have impressed him with the necessity of doing it.

DR. GIBSON: On the question of cleaning the badly soiled and clotted mangers and feed-troughs and so on, I have found no method equal to sand-blasting. You can go into the dirtiest set of feed-boxes and mangers, with the sand-blast, and come out leaving it just like when the carpenter finished his job.

DR. McLEOD: I would just like to say a word in connection with Dr. Barger's talk. He stressed the fact that a good deal depends upon the man who is doing the work. That is true. I have had some results on about 100 herds on retest work, which I have been following pretty closely, and I make a rule of disinfection; make it very impressive upon the owner that it is his cattle, and he has to look after it, as we haven't much time to go back over the grounds, but if necessary we will come back and show him how to go over it.

In Iowa we have farms that you cannot possibly disinfect. You have either got to lock the door, or nail it up, until the time comes when it can be systematically cleaned up. I make a rule in these cases to lock the door and keep the cattle out; in some cases just bar it up with nails and that impresses upon the owner the necessity of doing something and doing it quickly.

The reactors are taken away from there the minute they are known and separated, and the lye is used the same day if possible. If the floor can not be disinfected, and if the man is a renter, he has got to see the landlord and make arrangements to have the floor cemented, if it is dirt, and there are a good many things to look after before the place is thoroughly disinfected. We find that by locking the doors and barring them up, and keeping the cows in the open, it has turned out to be very satisfactory. I find in my retest work that there are very few reactors among cattle kept in the open.

DR. BARGER: On how many of those premises did you find reactors on the second test?

DR. McLEOD: Only five.

DR. BARGER: Dr. McLeod is in charge of a county area. We have data which show that there is a very low percentage of reactors on the second test.

DR. C. E. COTTON: I am certainly dumbfounded. We don't get these results in Minnesota. We have made two retests of all the infected herds in two counties. The first retest reduced the number of infected herds by two-thirds. In other words, we found sixty-six and two-thirds per cent of the herds that disclosed reactors on the first general test, disclosed no reactors on the first retest, and thirty-three and one-third per cent disclosed reactors. On the second retest of the thirty-three per cent still infected, we reduced the number of infected herds by one-half, thus leaving sixteen and two-thirds (16 $\frac{2}{3}$ %) per cent infected herds in the county.

I am afraid the impression has been left that if we disinfect thoroughly, following the first test when reactors are disclosed, that we can expect to find no reactors on the second test. We must not forget that there may be a number of infected cattle, and also cattle that have been exposed but in which the infection is not far enough advanced, that we will not disclose by the first test, and no matter how much cleaning and disinfection we do, we will later disclose reactors in such herds.

DR. J. A. KIERNAN: It is rather difficult, of course, to prove the effectiveness of the disinfecting of the stable where infected herds have been maintained. If you make a retest and an animal reacts, it is hard to attribute it to having been infected from the barn.

I can not recall, at this time, any herd becoming reinfected in a barn which had been cleaned and disinfected after the animals with foot-and-mouth disease had been removed. There may have been a few, but I can not recall any at this time, and I want to emphasize, as many have done here, the value of thorough cleaning, supplemented, of course, with the disinfecting.

The method employed in practically every state is cleaning the walls and scraping if necessary; scraping and sand-papering the stanchions; thorough cleaning out, as is followed by all veterinarians in their efforts to eradicate all diseases, is an effectual process of freeing those barns of infection.

DR. McLEOD: I attribute the results, which I spoke of, quite largely to the vulva injection. I was getting more satisfactory results from the double injection. I had very, very few suspects and I do not hesitate a minute to take out an animal with a vulva reaction.

DR. MORGAN: I am surprised that something has not been said further about cleaning up and disinfecting. When you get a man started with the spraying machine, with the shovel and hoe and what not, why not suggest that he go up to the horse-barn and clean that up, and last but not least, help his wife clean up the chicken-house. We call ourselves sanitarians and we think only of the cow-barn. We should go a little further and have the entire place cleaned up, and whitewashed, if possible, as it makes things look better. Sometimes the neighbors might come in and help with the milking. It takes only a minute to invite the man to help the wife overcome cholera, hemorrhagic septicemia, dysentery, and help control some of the horse diseases, and I believe we will be doing ourselves good, and I know that we will be doing our friends a great deal of good.

DR. BARGER: I want to make it clear that the experience of Dr. McLeod has not been the experience of all men engaged in area work in the state. That is one of the instances where we secured mighty near perfection and possibly as near as we will ever get. Now, his future experience may be just a little different, but on the whole, as I said before, the results of the area test showed quite a decrease in the infected premises as found on second test—a great decrease—and we attribute it largely to the veterinarian who has been on the ground and has been able personally to supervise the eradication of disease, by removing the animals as soon as they have reacted, and then following up with the cleaning and disinfecting of the premises immediately.

DR. WM. H. LYTLE: Was the testing done in the summer or winter, and what kind of animals were they?

DR. McLEOD: The testing covered a period from about the middle of

December to the present time. The first test was made in the winter. There was a mixed lot of beef and dairy cattle.

DR. GIBSON: I would like to suggest that probably in that instance a little Scotch sand would do the work. When you get a bad herd, that is when you are hitting the man hard, and you must be a real man and do your whole duty and go the limit. If there is any place you need to go the limit it is when you are in a bad herd. My theory is that, in a bad herd, all suspects are tuberculous. That is the way they should be treated, I think.

ANOTHER FAKE EXPOSED

Manufacturing and selling preparations for controlling lice, mites, ticks (blue bugs) and other external parasites of poultry, to be served to the fowls in their feed or drinking water, is a popular pastime of a number of concerns and one which the United States Department of Agriculture says should not be tolerated. A number of the mixtures advertised for use in controlling external pests, by being administered in the feed, have been tested by the Insecticide and Fungicide Board and all have been found to be ineffective. Among the products which were offered as powders to be mixed with the feed are several consisting of mixtures of sulphur, charcoal, magnesium sulphate, ferrous sulphate, nux vomica, capsicum, sodium carbonate, naphthalene, lime, salt and sand. Some of the mixtures were lime-sulphur solutions to be added to the drinking water; some calcium sulphid tablets of various percentages and having quantities of other chemicals as well. All were tested and found to be ineffective for the purpose advertised.

In view of these numerous tests the board has served notice on the manufacturers who may be selling or contemplate selling the above mentioned products, to be used in this manner for controlling external pests of poultry, that they are guilty of violating the provisions of the Insecticide Act of 1910, and that the products are misbranded. The board is of the opinion that these tests are sufficient to indicate strongly that such a method is ineffective and further that it is extremely doubtful if any substance will be found which will be effective when used in the feed or drinking water. Tests have not been made of all such mixtures advertised, but, taking into consideration the tests which have been made and the anatomy and physiology of chickens, it is believed that it is unlikely that any of the substances proposed, or any combination of them, when fed to chickens, will control any of the external parasites infesting them. These preparations are sold, for the most part, directly to consumers, by parcel post.

THE UNITED STATES ARMY VETERINARY SCHOOL¹

By CAPTAIN R. A. KELSER,

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Over 60 years ago an attempt was made to establish an Army Medical School at Washington for instruction of medical officers of the United States Army. That attempt, however, did not bear fruit, as it was 30 years subsequent before such a school was actually founded. On June 24, 1893, through the efforts of Surgeon General George M. Sternberg, America's pioneer bacteriologist, orders were issued by the Secretary of War, directing the establishment, in Washington, of an Army Medical School.

Housing space for this School was provided in the Army Medical Museum building. A faculty consisting of six officers of the Medical Corps was appointed, and a course of instruction extending over a period of four months was inaugurated. The first class was composed of nine officers.

Such was the starting of the United States Army Medical School, an institution now known throughout the civilized world for its achievements and contributions to medical science.

The advancement and development of the Army Medical School has, by no means, been an easy task. It owes its development and reputation to the foresight and untiring efforts of the many noted scientists who have served on its staff, and to the activities of the various Surgeons General who have served since its inception.

Up until last year the Army Medical School occupied rented quarters. As it outgrew old quarters, it would move to others which met its needs more adequately. In all these former moves, however, the institution failed in obtaining a permanent home of its own, befitting its character and position. On September 17, 1923, part of the dream of the Medical Department was realized. On that date the Army Medical School moved into its new half-million dollar building on what was formerly known as the Walter Reed Hospital Reservation.

Now comes the Army Veterinary School. Sensing the need for specially training veterinary officers in meat inspection work

¹Read before the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines, Iowa, August 19-22, 1924.

to meet the war needs of the Army, the Surgeon General, late in August, 1917, authorized a short course in such work at Chicago. Then with the reorganization of the Veterinary Service, in 1920, came the Veterinary School of Meat and Dairy Hygiene, a development of the nucleus started during the war. Largely through the efforts of the late Major George A. Lytle, V. C., this school rapidly developed and performed a valuable service in giving instruction in meat and dairy hygiene and forage inspection. In February, 1922, Army Regulations were published designating the Veterinary School of Meat and Dairy Hygiene at Chicago, Ill., as the Army Veterinary School.

Just prior to the removal of the Army Medical School to its new home on the Walter Reed Hospital Reservation, and in line with the desire to see a great medical center established on that reservation, it was decided that it would be a distinct advantage to have the Army Veterinary School as a part of such center. If such move could be accomplished, the course of instruction could be broadened, a larger number of instructors, well-known experts in their line, would be available, and the very best in the way of equipment and facilities could be expected. Further, as it was contemplated that the veterinary student officers would take a considerable portion of their work with the student officers of the Medical and Dental Corps, the mutual advantage and understanding to be derived from such contact stood out as a highly desirable factor. Only one disadvantage appeared. It was readily recognized that no place offered facilities for teaching meat hygiene as did Chicago. However, as it was thought that the Army Veterinary School should be permitted to develop as more of a general school than a school of a specialty, it was decided that the numerous advantages in having the School as part of the Army Medical Center far outweighed the lessened facilities for teaching meat hygiene at such center.

The Chief of the Veterinary Division placed his recommendations before the Surgeon General, who heartily approved the plan and submitted same for the consideration of the General Staff and the Secretary of War. The project was approved, and on August 31, 1923, orders were issued by the War Department creating an Army Medical Center on the Walter Reed Hospital Reservation, to consist of the Walter Reed General Hospital, the Army Medical School, the Army Veterinary School, the Army Dental School, and the Army School of Nursing. Accord-

ingly the Army Veterinary School was removed from Chicago and reorganized under the Army Medical Center at Washington, D. C.

This action marked an important epoch in the history of veterinary medicine in the United States. But a few years back, the United States Army, hampered by inadequate legislation governing veterinary service, gave less recognition to the veterinary profession than any other organization employing veterinary service. Finally, Congress granted the long-sought-for recognition by authorizing rank for army veterinarians. Then, with the termination of the World War, came the reorganization of the veterinary service, developing our present well-organized corps, capable of functioning at a maximum degree of efficiency. Now comes the establishment of the Army Veterinary School as an integral part of what bids fair to become one of the greatest medical centers in the world.

The Army Veterinary School, through its connection with the Medical School, is given advantage of the 30 years' experience and development of the latter school, and, because of this connection and splendid cooperation, today finds itself enabled to render a school service which, under other conditions, would have required years of development.

Before outlining the work of the Army Veterinary School, I will merely mention the administrative organization of the Army Medical Center. The Center, as a whole, is under a Commanding Officer who is responsible for the satisfactory operation of the entire post. He is assisted by an Executive Officer and Adjutant. Under the Commanding Officer of the Center are the Commandants of the Army Medical School, the Army Veterinary School, and Army Dental School, and the Director of the Army School of Nursing. The Walter Reed General Hospital occupies the same relation to the Center as the schools, and is under the immediate supervision of a commanding officer, who at the present time, is also the Commanding Officer of the Center.

The detail plan of organization of the Army Veterinary School is identical with that of the Medical and Dental Schools. The administrative staff consists of the Commandant and an Executive Officer. For instruction purposes the School is divided into five departments, each of which is under the supervision of a Director. Serving under the various Directors are from one to six or more instructors.

The total faculty of the Veterinary School for the session which ended June 7, 1924, consisted of four officers of the Veterinary Corps and six officers of the Medical Corps. The work in forage inspection is given in conjunction with the U. S. Bureau of Agricultural Economics, this organization providing several experts for such instruction. Further, accredited herd work and special lectures are given by specialists in the U. S. Department of Agriculture. The Surgeon General's Office and the Quartermaster General's Office likewise provide special lecturers on administrative subjects and quartermaster subsistence requirements.

The five departments of the Army Veterinary School are: The Department of Meat and Dairy Hygiene; the Department of Veterinary Forage Inspection; the Department of Preventive Medicine and Clinical Pathology; the Department of Roentgenology; and the Department of Veterinary Surgery and Pathological Horseshoeing.

The course at the Army Veterinary School during the coming year will occupy 777 hours, extended over a period of 5 months and 10 days. Immediately following the completion of the course at the Army Veterinary School, the student officers, together with those of the Medical and Dental Schools, are transferred to the Medical Field Service School at Carlisle, Penna., for an additional three months' schooling in field service.

The Department of Meat and Dairy Hygiene gives a course extending over 241½ hours. Instruction in this department is given through practical demonstrations at the abattoir and lectures, the practical demonstrations being allotted the greater percentage of time. Further, in connection with the work in milk hygiene, visits are made to pasteurizing plants and dairy farms. The accredited herd work is given by officials of the Tuberculosis Eradication Division of the U. S. Bureau of Animal Industry, and consists of practical field demonstrations.

The Department of Veterinary Forage Inspection, through the cooperation of the U. S. Bureau of Agricultural Economics, provides a course of the highest order. Laboratory work in scoring and analyzing various kinds and grades of hay and straw forms an important part of the work of this department. Specification requirements, Federal grades, and practical car inspection of roughages are given due consideration. Defects of roughages, nutritive qualities and baling characteristics are treated of.

This department also gives ample instruction on concentrates. The classification and grading of oats, corn and barley are given. Moisture tests, tests for the detection of sulfured oats, etc., are demonstrated. Other concentrates, including the Army Compressed Forage Ration, are considered.

The Department of Preventive Medicine and Clinical Pathology is the link which connects the Army Medical School, the Army Veterinary School, and the Army Dental School. This department is primarily a department of the Army Medical School, but its work is given for all three schools. In addition to the Director of this department, there are several Assistant Directors, one a veterinary officer, on duty at the Army Medical School and serving as an Assistant Director for the Veterinary School, and another who is a dental officer, on duty at the Army Medical School and serves as an Assistant Director for the Dental School.

Under this department instruction is given veterinary officers in bacteriology, protozoology, helminthology, immunology, sanitary chemistry, pathology, entomology, sanitary engineering, vital statistics, and communicable diseases of animals. A total of 338½ hours is allotted. This work is largely practical, and is given by a corps of instructors who are outstanding specialists in their line. It is the work of this department which brings the students of the three schools together on a common basis, thus making the department the most important of the three schools.

The Department of Roentgenology is likewise directed by the Army Medical School. The Director is assisted by an instructor who is an officer of the Veterinary Corps. The course consists of instruction in elements of electricity, X-ray physics, the construction and wiring of X-ray machines, operation of the various types of machines, taking radiographs, developers, fixatives, etc. Practical instruction is given in the taking of radiographs of bone fractures in equine specimens, arthritis of animals, side-bones, ring-bones, penetrating objects in the hoof, dental conditions, etc. Roentgenology in small animal practice is also demonstrated, and includes fluoroscopy. This course has proved intensely interesting, and clearly demonstrates the value of roentgenology in veterinary medicine.

For instruction under the Department of Veterinary Surgery and Pathological Horseshoeing, the class is taken to Fort Myer, Va., a nearby Army post, where proper facilities for giving this subject are to be found. The instruction includes the perform-

ance of the various operations of importance in the Army Veterinary Service. This work is performed by the student officers themselves, under proper supervision. As shoeing and pathological conditions of the feet are of the utmost importance in the Army, ample instruction is provided in this line.

This concludes the outline of the work of the Army Veterinary School. However, it would be a mistake to close without taking this opportunity to emphasize the fact that the Chief of the Veterinary Division of the Surgeon General's Office and the Surgeon General of the Army, in their efforts which brought about the organization of an Army Veterinary School at the Army Medical Center, have added another step to veterinary progress in the United States.

One more thought and I am through. The Medical Department of the Army is untiring in its efforts to render service of the highest order. In time of war, it, like other component parts of the regular Army, must depend on the man from civil life to augment its small force. A definite plan of organization for emergency has been formulated. The veterinary profession is counted upon to furnish 2768 members for commissions in the Veterinary Corps. The plan does not contemplate waiting until the dawn of an emergency before recruiting such a number. Efforts are being made to have them come in the Reserve Corps now. At present, we have 886 veterinary officers in the Reserve Corps. I appeal to the members of this Association to recognize, by joining the Reserve Corps, the efforts the Surgeon General has made for the good of the veterinary profession.

CIVIL SERVICE EXAMINATION

ASSISTANT LAY INSPECTOR, \$1,500, October 8, 1924. Vacancies in the Bureau of Animal Industry, and in positions requiring similar qualifications, will be filled from this examination. It is expected that approximately 100 vacancies in the Bureau of Animal Industry will be filled from this examination within the next 12 months. Advancement in pay may be made without change in assignment up to \$1,860 a year. Applicants must have sound physical health, moisture and cold being incident to packing-house and stock-yard employment. Applicants should at once apply for form 2415, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.

OBSERVATIONS ON THE THERAPEUTIC ADMINISTRATION OF CAMPHOR AND STRYCHNIN AS CIRCULATORY STIMULANTS¹

By A. D. HIRSCHFELDER and E. A. HEWITT

Minneapolis, Minn.

St. Paul, Minn.

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Veterinary Medicine, University of Minnesota.)*

In spite of the wide use of strychnin and camphor, as circulatory stimulants, in clinical practice for many years, accurate clinical observations, in which blood pressure and pulse rate have been controlled, throw considerable doubt upon the effect of these drugs. R. C. Cabot showed, in a series of 3000 blood-pressure determinations in typhoid fever cases, that no effects on blood pressure or pulse rate were demonstrable, and similar observations were made by F. Parkes Drayer, in a series of fifty patients in private practice. A. D. Hirschfelder has shown that increases of blood pressure, amounting to 10 mm. of mercury, are likely to occur from the pain sensations which result from the prick of the hypodermic needle, and that this variation represents the maximum that is obtained from the use of strychnin in clinical practice.

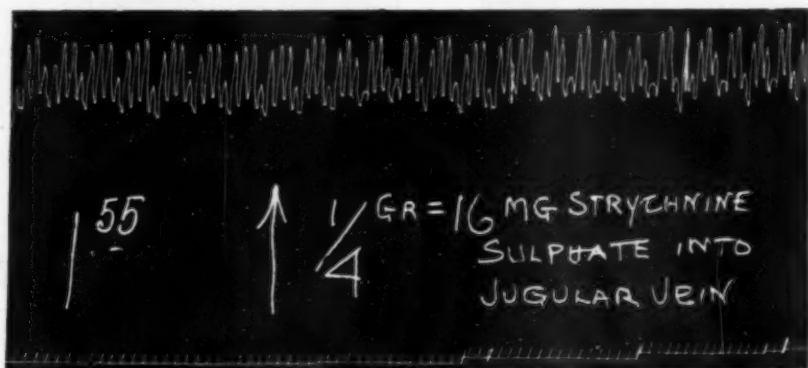
Similar observations on the non-efficacy of strychnin have been made by Lucas, Edsall, Means, and Newburgh. In the class work in experimental pharmacology for medical students, at the University of Minnesota, it is customary for the students to inject, intravenously, amounts of strychnin corresponding to doses of 8 mgms. for an average size man without obtaining any effect whatever on blood pressure or respiration. Similar negative results are obtained with intravenous injections of spirits of camphor, in laboratory animals, in doses corresponding to 6 grains of camphor for an average size man. The effects of this drug were also investigated on a series of medical students, and doses amounting to 60 mgs. were injected hypodermically without producing any rise in blood pressure whatever, even though in some cases definite signs of collapse were induced in the subjects. Even when the blood pressure was lowered by the previous administration of nitrites, the injection of camphorated

¹Received for publication, April 19, 1924.



oil or spirits of camphor hypodermically was without effect on blood pressure.

Veterinary practitioners have employed the use of camphorated oil and strychnin more or less empirically. They have not observed their patients after such administrations to determine accurately whether there was any improvement in circulation or not. They have taken it for granted, because it has been stated in textbooks that they were receiving benefits therefrom. The recommendations of oil of camphor as a secondary stimulant for the horse vary from 10 cc repeated at half- to one-hour intervals, to 90 cc at a single injection. In view of these facts, it seems of interest to study the effect of strychnin and camphor upon the circulatory mechanism in the horse. A 1400-lb. horse was obtained and anesthetized with chloroform. The carotid artery was dissected out, a cannula introduced, and the blood pressure recorded with a mercury manometer in the usual



manner. Two cubic centimeters of spirits of camphor, injected into the right jugular vein at 11:36 a.m., produced no noticeable effect on blood pressure or respiration (fig. 1), but at 11:47 transitory, convulsive movements set in. These passed off. At 11:50 another 2 cc of spirits of camphor was introduced. This also was without effect upon blood pressure, but at 11:55 convulsions set in again. At 12:05 4 mgs. ($\frac{1}{16}$ of a grain) of strychnin was injected (fig. 2). This also was without effect upon the blood pressure, but transitory convulsive movements set in within a few seconds. Later in the experiment, doses of 4 mgs., 8 mgs., and even 16 mgs. were injected intravenously (fig. 3), and, in spite of the presence of convulsions, there was no discernible effect on blood pressure. This animal was very



resistant to strychnin, and received, in all, 32 mgs. ($\frac{1}{2}$ grain) of strychnin without a fatal result. The animal was killed finally, by bleeding. On the other hand, another horse was killed by a single dose of 16 mgs. ($\frac{1}{4}$ grain) of strychnin, intravenously, with marked convulsions. In this animal also there was no discernible effect on blood pressure.*

In contrast to this, a relatively small dose of adrenalin (1 mg.), intravenously, gave a very marked rise of blood pressure amounting to 40 mm. of mercury (fig. 4). Adrenalin injected into the pectoral muscle, in doses of 4, 10, 20, and even 50 mgs., gave very little effect (fig. 5).

The results of these experiments are in accord with the clinical observations in man and the experimental observations made upon the smaller animals, that strychnin and camphor are not efficient circulatory stimulants, and the best circulatory stimulant for larger animals is adrenalin injected directly into the blood stream. Adrenalin injected intramuscularly is of doubtful value.

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VARIETY

On the statements for the 1924 dues we stenciled the address of each member, as we had it, and asked the question: "Have we your correct address?" The following answers have been made to our query:

No.

Yes.

O. K.

Correct.

You have!

It is excellent.

For the present.

*W. Hamilton Kirk has recently called attention to the fact that great variations in sensitiveness to drugs occur in domestic animals, as compared to man. He states that horses and cattle are less sensitive to strychnin than are man and dogs, and that one grain of strychnin hypodermically is a safe medicinal dose for horses, while 3 to 6 grains are fatal. Our second horse was, therefore, exceptionally sensitive; the first was less sensitive than usual to strychnin. He cites doses as high as 30, and even 60 grains, given to cattle by mouth without producing death, but states that 5 to 6 grains hypodermically are usually fatal. On the other hand, pigs are convulsed by $\frac{1}{6}$ to $\frac{1}{4}$ of a grain, and dogs may be killed by $\frac{1}{6}$ of a grain. He also discusses the variation in susceptibility of domestic animals to the other commonly used alkaloids.

THE POISON PLANT SITUATION IN INDIANA.—II*

By ALBERT A. HANSEN

Purdue University Agricultural Experiment Station

WHITE SNAKEROOT

When the early settlers entered Indiana and turned their stock into the woods for pasture, one of the big problems that confronted them was the heavy losses to all grazing animals due



FIG. 1.—Flowering top of white snakeroot. Note the clusters of small white blossoms and the pointed, opposite leaves, each with three prominent veins.

to a peculiar disease, the most prominent symptom of which was severe trembling. The trouble was evidently prevalent throughout Indiana and the region now occupied by neighboring states. The disease was given the descriptive name "trembles."

*Second of a series of three articles based on papers presented before the Indiana Veterinary Medical Association.

It was soon noted that wherever cows died of trembles, a human disease characterized by frequent and violent vomiting also became prevalent, and this human trouble was called "milk sickness," because it was believed that the same poison that caused trembles in animals entered the milk and poisoned the human. One account² states that more than half of the deaths that occurred in Dubois County, Indiana, in 1815, were due to milk sickness and the disease caused heavy losses among stock. In the vicinity of Lincoln City, Indiana, the burial place of Nancy Hanks, mother of Abraham Lincoln, local tradition relates that her death was due to milk sickness.

The trouble was attributed to all sorts of things, from poisonous minerals and water to mushrooms and white snakeroot. The cause of the trouble was not definitely known until comparatively

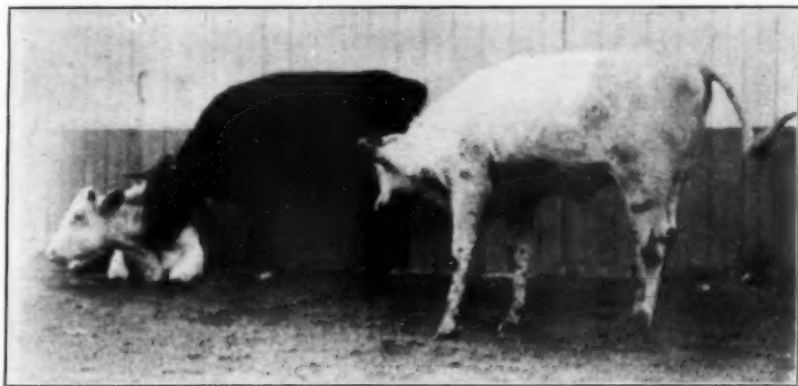


FIG. 2—Three cattle suffering from a natural outbreak of trembles on an Indiana farm. (From Bull. 270, Purdue Univ. Agri. Exp. Sta.)

recently, when the excellent feeding experiments of Marsh and Clawson,³ of the United States Department of Agriculture, Wolf, Curtis and Kaupp,⁴ of the North Carolina Agricultural Experiment Station, and Doyle and Walkey⁵, of the Purdue University Agricultural Experiment Station, definitely demonstrated that white snakeroot, *Eupatorium urticaefolium* Reichard (*E. ager-toider* L.), a common plant in woods that have never been cultivated, is the cause of trembles in animals. Marsh and Clawson proved that the plant is poisonous to cattle and sheep in both the fresh and dry state; Wolf and his co-workers not only proved that the plant caused trembles in sheep, but also demonstrated that the poison is carried in the milk and affects the suckling young, while Doyle and Walkey demonstrated the poisonous properties

of the dry and fresh plant in cattle and horses and pointed out the fact that horses fed with white snakeroot did not exhibit the trembling symptoms so characteristic of the disease in sheep and cattle. A successful, farmers' feeding demonstration with white snakeroot was recently described in these columns.⁶

The large amount of field work that has been done in Indiana with white snakeroot poisoning has yielded interesting and valuable results. Not only has the dangerous plant been found in practically every section of the state, but entire districts have been located in which heavy losses have been experienced every year for many years past and in which a number of cases of milk

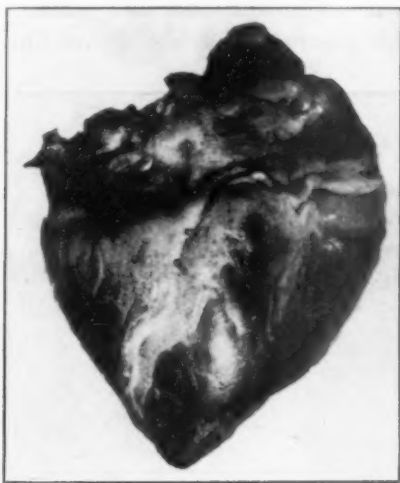


FIG. 3—Heart of a horse that died from white snakeroot fed experimentally. Note the numerous subepicardial hemorrhages. (From Bull. 270, Purdue Univ. Agri. Exp. Sta.)

sickness in the human occur. One of these districts centers around Marengo, in Crawford County, an area in which the local veterinarian states that on practically every farm, on which woods are pastured, losses of one or more animals occur every year. In several instances, milk sickness in the human was traced directly to the use of milk from cows that had been allowed to graze freely on white snakeroot.

A compilation of the symptoms observed and described by farmers indicates that the following may usually be noted in cattle:

1. Affected animals first become listless, are slow of motion and disinclined to exert themselves. This condition has been

called the "lazy" or "spring-fever" stage, by the Indiana farmers.

2. The spring-fever stage is frequently, but not always, accompanied by constipation.

3. Spasms of violent trembling usually follow the spring-fever stage. This may be brought on earlier by attempting to drive the "lazy" cattle. During periods of trembling, the back is frequently arched in a characteristic manner.

4. The breath may become foul, with a peculiar, repugnant odor.

5. The joints become stiff and the animal falls, showing great disinclination to rise or otherwise exert itself. This stage frequently is followed by death from general weakness and exhaustion.



FIG. 4—A dense patch of white snakeroot growing on a woodland border in Indiana. White snakeroot grows typically in open woods and rarely thrives in the open.

The disease may occur at any time of the year, although most cases have been observed from early June until frost. Reports of winter snakeroot poisoning are not rare, since even the frosted plants are apparently poisonous. In one case, in Decatur County, a number of goats were lost from what appeared to be winter snakeroot poisoning.

In horses, general sluggishness and listlessness are first apparent

followed by throat paralysis, salivation, depression, stiffness, weakness and low carriage of the head. In sheep, the first symptom seems to be loss of appetite, accompanied by gritting of the teeth and marked sluggishness. The limbs stiffen, the gait becomes clumsy, spasms of violent trembling ensue, during which the back is characteristically humped, and the animal falls. A state of coma usually precedes death. White snakeroot is not

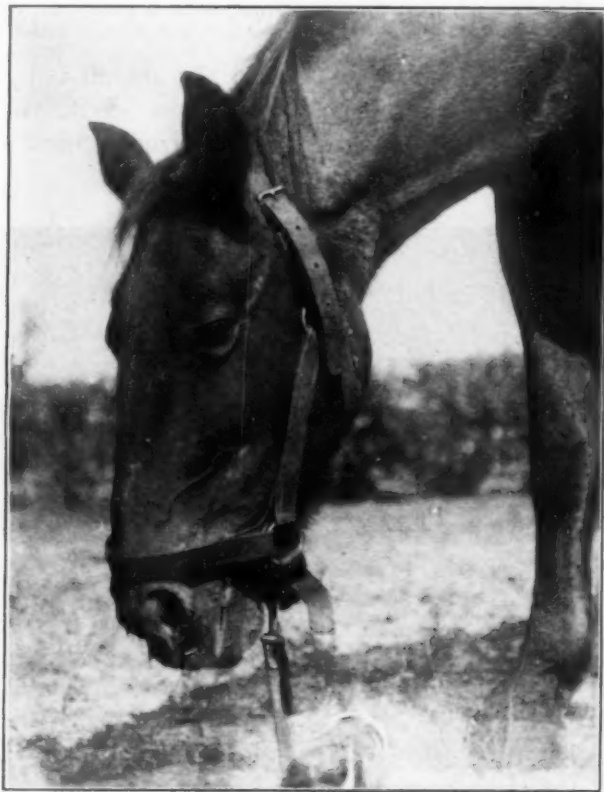


FIG. 5.—A horse suffering with snakeroot poisoning. The drooping head and forlorn expression are typical of horses affected with the disease. The animal pictured above died a short time after the photograph was taken without exhibiting the trembling symptoms typical of cattle poisoned by white snakeroot.

thought to be poisonous to grazing hogs, although in one case investigated eleven suckling pigs died from trembles that was evidently contracted through the poisoned milk of the mother sows that had grazed in a small woodlot heavily infested with white snakeroot.

White snakeroot is a common woodland plant, with thin, opposite, long-pointed, spear-head-shaped leaves, the upper sides

of which are dull and the under sides shiny, while each leaf has three prominent veins. The roots are perennial and fibrous. The flowers are small, conspicuously white and appear in clusters during September, October and November. The only practicable method of eradication is hand-pulling during the flowering period, when the individual plants can be readily located. Mowing is of little avail, since the roots sprout freely. The plant sometimes called white snakeroot in the catalogs of medicinal plant houses is not the poisonous species. There are a number of harmless relatives of white snakeroot with which the plant can easily be confused.

WHITE SNAKEROOT

GROWS TYPICALLY IN WOODLAND PASTURES

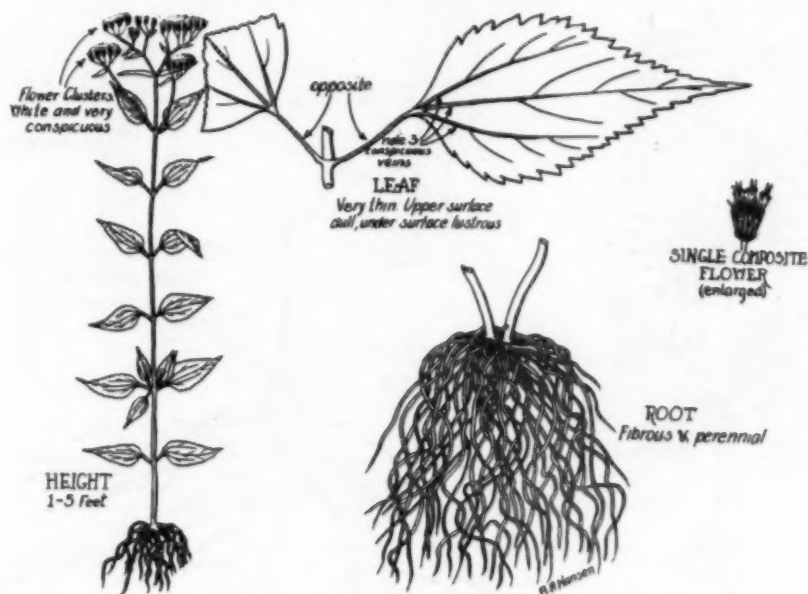


FIG. 6—Distinguishing characteristics of white snakeroot

It is estimated that more than ninety per cent of the losses of grazing animals from plant poisoning in Indiana woodland pastures is due to white snakeroot poisoning.

WATER HEMLOCK

One of the unexpected results of the poison-plant field work in Indiana was the finding of large quantities of water hemlock in moist places throughout the state and the tracing of numerous cases of cattle and hog poisoning to this dangerous species.

Water hemlock or cowbane, *Cicuta maculata*, contains cicutoxin, one of the most powerful plant poisons known. Cicutoxin is a glistening yellow fluid that may be seen when the fleshy tubers are cut and that seems to exist principally in the underground parts. The young shoots are also dangerous. Whether or not the tops are poisonous is a mooted question. A bulletin issued by the New Mexico Station⁷ states that in a number of

WATER HEMLOCK

GROWS IN MOIST SITUATIONS ONLY.

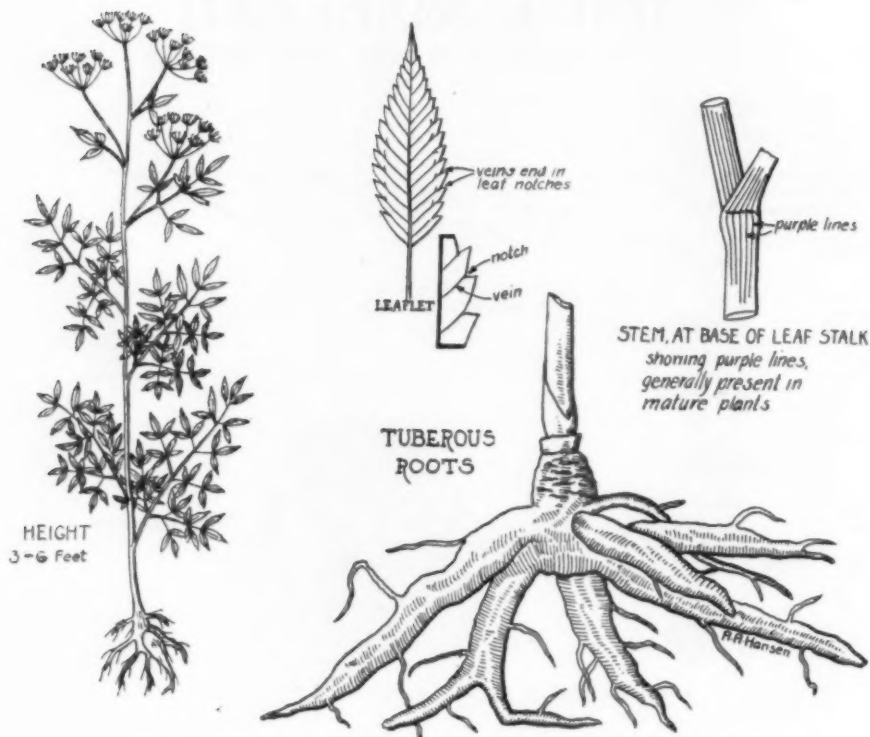


FIG. 7 Distinguishing characteristics of water hemlock, *Cicuta maculata*

outbreaks of water hemlock poisoning investigated, poisoning took place from eating the leaves and stems. Experience in Martin County, Indiana, seems to support this statement, although most of the trouble in Indiana seems to have originated from the bulbs. The plant is poisonous to all grazing animals and to human beings. A well authenticated case of fatal human

hemlock poisoning, that of Clyde Shady, of Craigville, occurred in Indiana during 1923.

The danger from water hemlock seems to be greatest during the spring and during periods of drought, when hogs root for food. The following symptoms seem to be characteristic: (1) nausea accompanied by muscular twitching; (2) staggering gait (in hogs the animals seem to become blind and run wildly and aimlessly about); (3) violent convulsions or paroxysms, accompanied by attempts to vomit and oftentimes by salivation; (4) death, apparently from asphyxiation and weakness, occurs usually in from one-half to ten hours, according to the amount ingested. All cases noted in Indiana have not proved fatal,

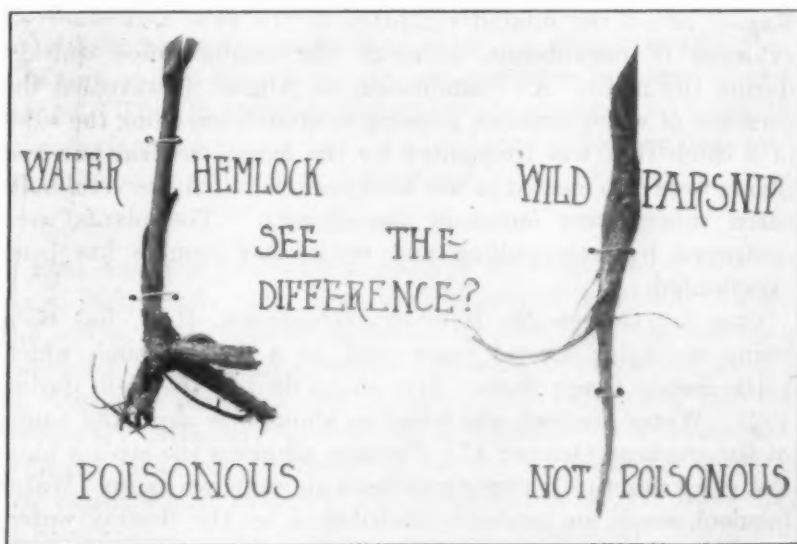


FIG. 8.—Material used in window exhibits of poisonous plants in Indiana. The branched poisonous root of water hemlock serves to distinguish the plant from the unbranched harmless root of wild parsnip, *Pastinaca sativa*, which water hemlock resembles and with which it is frequently confused

although recovery is the exception rather than the rule. No antidote for water hemlock poisoning is known. The toxicity of water hemlock seems to vary considerably.

The plant should be eradicated by grubbing or careful hand-pulling during the early spring. A sharp watch should be kept for sprouts and seedlings. Water hemlock is frequently confused with wild parsnip, a plant that is frequently, but incorrectly, accused of being poisonous, a reputation probably gained through its confusion with the hemlock. Water hemlock has tuberous

roots somewhat similar to a cluster of small sweet potatoes, whereas the root of wild parsnip is usually unbranched and resembles a tame parsnip in appearance, odor and taste.

In some parts of Indiana, noticeably in Martin, Jackson, Fountain and Whitley counties, water hemlock grows in great abundance. A swamp several acres in extent, located in Whitley County, was so badly fouled with dangerous plant that the entire area was white with water hemlock blossoms during the flowering period.

A brief review of several typical cases investigated may be of interest:

Case 1: Frank Kayser, Frankfort, R. 6, lost five hogs during the August, 1922, drought, when the pasture was short. Mr. Kayser noted the dilated condition of the eyes and observed evidence of convulsions, although the animals died quickly during the night. An examination on August 18 revealed the presence of water hemlock growing in abundance along the sides of a ditch that was frequented by the hogs. Several hundred plants were also located in wet land near the ditch. Several half-eaten tubers were found in the vicinity. The plants were destroyed by hand-pulling and no further trouble has been experienced.

Case 2: George M. Heubner, Grandview, R. 1, has been losing stock for several years past, in a field through which Little Sandy Creek flows. Five sheep died in this field during 1922. Water hemlock was found in abundance along the banks of the creek on October 17. Farmers all along the stream have lost stock practically every year from an unknown cause. Water hemlock seeds are probably distributed by the flowing water, since the plant grows plentifully all along the stream.

Case 3: Lowell Stallings, of New Harmony, lost 6 beef cattle during 1922 on a pasture in which water hemlock was found on November 7. The plant was said to have been growing abundantly in the pasture before the animals died, after which the land was plowed, but a number of specimens were found along the banks of a creek that flowed along one side of the field. The affected animals were observed to stagger, develop convulsions and become paralyzed before death. Stock has been lost in this field for many years.

Case 4: William Bough, of Burn City, has been losing hogs in a field every year for several years past. Claimed the most prominent symptom was running wildly in circles in a counter-

clockwise direction. A number of water hemlock plants were found in the pasture. Several farmers in the vicinity, when shown specimens of the plant, declared it was plentiful throughout the section and they reported yearly losses of stock.

Case 5: Herschell Armstrong, of Loogootee, lost four cows during the winter of 1923, from what was thought to be poisonous hay. An examination of the hay revealed large numbers of water hemlock plants. A neighbor lost two cows after feeding the same hay. During the following July a large number of water hemlock plants were destroyed in the meadow from which the hay was secured. The evidence in this case is purely circumstantial, but deemed worthy of note.

Case 6: Six hogs on the farm of James W. King, Jr., Attica, R. 3, were poisoned during mid-April, 1924, on a piece of previously unused swampy land. In Mr. King's words, they "all tore around blind and mad and seemed to go crazy all of a sudden. They frothed considerably at the mouths." Thousands of water hemlock plants, both old dead ones and young ones with small bulbs, were found in the wet soil.

COCKLEBUR SPROUTS

Ever since the field work in Indiana was commenced, losses of hogs, particularly pigs, have been observed, especially during the spring, that could be explained by no other reasoning than poisoning by cocklebur sprouts. Following an illustrated lecture on poisonous plants during January, 1922, before the Indiana Veterinary Medical Association, a number of veterinarians reported losses they believed to be due to cocklebur sprouts. No experimental evidence was available, however, until the announcement of the successful feeding experiments conducted by Marsh and Clawson,* of the United States Department of Agriculture. These experiments demonstrated that seedling cockleburs, in the cotyledon stage, are distinctly poisonous to swine. Farmers and veterinarians have had difficulty in recognizing this stage of the plant, since the cotyledons are narrow with somewhat the appearance of grass leaves, and have little resemblance to the true leaves of cocklebur. In fact, as soon as the true leaves begin to develop the plant apparently loses its toxic properties. Unfortunately, during the cotyledon or poisonous stage, the young plant is succulent and animals graze upon it, whereas after the true leaves develop the plant is usually untouched.

Numerous fatal cases of cocklebur poisoning in swine have been observed in Indiana and we have reason to believe that the problem is a far more serious one than is at present realized. It is possible that many cases that have been diagnosed as hemorrhagic septicemia were in reality due to cocklebur poisoning. In most cases studied, poisoning took place when moist land dried, particularly following spring rains or the recession of overflow



FIG. 9—The toxic stage of a cocklebur sprout. The poisonous principle is contained in the pair of narrow cotyledonary leaves. The bud from which the true leaves will develop is shown between the cotyledons

water. It is then that the burs sprout simultaneously in large numbers and trouble is most apt to occur.

Difficulty in getting results from feeding the sprouts was at first experienced by the Veterinary Department of Purdue University. Even seedlings fed within four hours after picking

did not seem to affect the pigs, although the animals ate the succulent sprouts very readily. It was not until the burs were planted and the animals were allowed to eat the growing sprouts that definite results were secured. Two hogs turned into a small, sprout-infested enclosure died within 24 hours. A third animal was allowed to eat the plants after the true leaves had developed and no poisonous effects were noted.

The outstanding symptoms observed by farmers are: (1) affected animals first throw their heads backward in a peculiar manner; (2) the sick hogs then knuckle over on their hind legs and lose their appetite; (3) they lose control of their hind-quarters, stagger a great deal, but seem to regain control of their normal gait after staggering for some distance; (4) the animals finally fall and lie on their sides, frequently squealing as though in pain; (5) spasms develop; the eyes appear to turn white and death ensues in from 24 to 36 hours after the first symptoms were noted. Marsh and Clawson describe the external symptoms as depression, nausea, vomiting, rapid and weak pulse, low temperature and frequently spasmodic movements before death, the symptoms being exhibited but a few hours before death. Cocklebur sprouts are also poisonous to cattle and sheep.

A brief review of the circumstances surrounding a few typical cases may be of interest and value.

Case 1: Foster Hoffman, Center Point, R. 3, lost eight swine (mostly pigs) during the first week of May, 1923, in a hog-lot which, on examination a few days later, was found to be so badly infested with cocklebur sprouts that it had the appearance of having been recently sown to grass. The animals died within 36 hours after they were turned into the enclosure.

Case 2: Will Adams, Azalea, has lost hogs every season on a piece of land on which he turned the animals to graze when it dried off in the spring. During 1922 he lost five hogs in this manner. The trouble usually occurred during April and May. The symptoms described corresponded closely with the symptoms noted in other cases of cocklebur poisoning. The land was found to be heavily infested with cocklebur sprouts.

Case 3: Walter Grelle, Dillsboro, R. 3, lost eight hogs during the first day they were turned in the pen, about mid-May, 1923. The local veterinarian posted the animals and found the stomachs filled with leaves which matched with plants found growing densely in the pen. A number of these plants were sent

to Purdue for identification and were found to be cocklebur sprouts.

Case 4: Jesse Carlson, of Attica, R. 2, lost six pigs on the night of May 18, 1924. Two of the animals were posted and cocklebur sprouts were found in the stomachs. An examination of the field revealed heavy patches of cocklebur sprouts where the pigs had been grazing, on many of which the leaves had been off. A quantity of burs from old plants in the field was collected and planted and the sprouts were grazed by three hogs under the supervision of the Veterinary Department. The first two hogs turned into the experimental feeding pen, in which the only green growth was cocklebur sprouts, died within a few hours. An examination of the sprouts in the pen revealed that many of the cotyledons had been eaten by the animals. One of the dead animals showed little evidence of the sprouts in the stomach.

Case 5: Ernest Maurer, Connersville, R. 2, lost thirty-six hogs during the spring on moist land infested with cocklebur. Several of the animals were posted and the sprouts found in the stomachs. The symptoms described by Mr. Maurer seemed to be characteristic of cocklebur poisoning.

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FORESTRY REGULATIONS AMENDED

An amendment to the regulations governing the use and protection of the National Forests, which makes it possible to close them against grazing by live stock during outbreaks of dangerous diseases of domestic animals, such as foot-and-mouth disease and scabies, was signed August 12, 1924, by Secretary of Agriculture Wallace.

The amendment authorizes the District Forester, in case of need during outbreaks, to issue orders to remove cattle, sheep, hogs, or other animals being grazed on the Forest, or to prevent their movement into the Forest, except under special permit.

This modified regulation will assist greatly in facilitating the eradication of disease or in preventing its spread.

A DISCUSSION OF SOME OF THE MORE COMMON SKIN AILMENTS OF LARGE ANIMALS

By G. E. JORGENSEN, *Clermont, Iowa*

(Continued from page 782, September issue)

It may be well here to call attention to the fact that the administration of sera, either normal or antibacterial, if non-specific, is sometimes attended with urticarial symptoms.

ALOPECIA

Alopecia is a general term applied to deficiency or absence of hair. Clinically there are two forms met with in large animals. One is attended with loss of hair in small circumscribed areas and the latter follows, as a rule, such infectious diseases as influenza, purpura, and in fact all septic processes of a general nature may be followed by general loss of hair. The symptoms are self-evident. In alopecia areata the condition is circumscribed. It is differentiated from mange by the absence of mange mites and from tinea tonsurans by the absence of scabs, crusts and broken hairs. The cause of alopecia areata is essentially theoretical at the present. One theory sponsors the supposition that the condition is due to neurotic disturbances. Another believes the condition to be due to parasites.

Alopecia areata is more or less persistent. The treatment is difficult. Application of a "hair tonic," consisting of the following, is frequently attended with beneficial results.

Quinine Sulphate	℥ss
Tinc. Cantharides	℥ss
Spts. Ammon. Arom	℥ii
Castor Oil	℥ii
Alcohol	q.s. ℥vi

This is to be applied twice a day and the areas well massaged. The symptomatic or general variety is evanescent and requires no treatment, inasmuch as the loss of hair is followed by new growth in a short time.

ECZEMA

Eczema is an acute, subacute or chronic catarrhal inflammatory disease of the skin, characterized by the appearance of erythema, papules, vesicles or pustules, or combinations of two or more of these, and accompanied by more or less itching and

exudate. The disease is relatively common to all species, but is seen more frequently in equines than in bovines.

Etiology: In studying the causes of eczema there are many factors which must be considered. It seems improbable that heredity plays any direct part, although individuals are born with a skin which is especially susceptible to irritating influences and thus a predisposition to eczema. We are aware that certain irritating influences will produce dermic inflammations in any skin which is exposed to them. As a rule, however, the reaction is merely a passing one and the lesion rapidly passes off. In certain individuals, however, the dermic reaction passes into a true eczema. The nature of this predisposing factor is still an unknown quantity.

The exciting cause of eczema in large animals may be any external irritant which, therefore, includes such influences as chemic, mechanical, thermic and infectious. However, these are merely exciting causes, for, as pointed out above, if a large number of individuals were exposed to these irritating influences only a small minority would develop true eczema. It is obvious, therefore, that a direct and basic etiological factor exists, the nature of which is as yet unknown. External irritants are most commonly the exciting cause, yet internal causes operating in conjunction with the unknown factor are not at all rare. The internal or constitutional causes are varied. They include all systemic conditions, transient or permanent, which cause impaired vitality.

Pathology: Investigational work has shown conclusively that the disease is a catarrhal inflammation of the skin. The earliest histopathological lesions consist of parenchymatous edema of the transitional epithelium. This results in a thickening of the layer of prickle cells. Edema is also present in the granular layer and thus interferes with normal keratinization. The serous infiltration of the entire epidermis results, sooner or later, in a production of a typical epithelium. At the same time there is in progress dilation of the vessels of the papillary layer, diapedesis of leucocytes and more or less infiltration of the entire corium and, in some instances, involvement of the subcutaneous tissue. Vesicle formation occurs in the middle or upper layer of the rete malpighii and frequently originates in a single epithelial cell, as a result of dropsical degeneration and expansion. The exudate of eczema is made up of serum and the fluid resulting from dropsical degeneration of the cells of the malpighian layer.

Symptoms: The general clinical picture of eczema depends upon

the stage present. The disease is characterized by various stages, each of which passes into another with marked rapidity. Thus we are able to recognize the following stages in eczema: erythema, papule and vesicle formation, pustule formation, red or weeping stage (eczema madidans), scaling stage, seborrheic and sycosiform eczema. Itching is a constant symptom. If the disease is acute or more or less generalized there may be fever. As a result of local disturbances and nutritional interferences the animal may become emaciated.

In the bovine species a form of eczema is met with in cattle fed on malt or potatoes. Another form of eczema met with in this species is due to irritation of the skin with feces or urine and is most frequently seated on the posterior surface of the hind legs and between the digits. In the horse the most frequent seat of the disease is the skin of the mane and the tail and the flexor surfaces of the limbs. In the late winter and early spring a more or less diffuse eruption of pustules and vesicles is frequently seen. Eczema due to sweating and chafing under the saddle blanket is frequently seen in riding horses. Perhaps one of the most common forms of eczema met with in equine patients is that condition known as "scratches," mud fever, etc. This is due to trauma or to irritation from constant exposure to mud and moisture; especially in horses having long coarse hairs in the fetlock region.

It is really not necessary to write a great deal concerning the clinical picture of eczema. When the statement is made that the disease is an acute or chronic catarrhal inflammation of the skin, which presents a rapidly changing picture from simple erythema or redness, on through the various stages from papules to vesicle and pustule formation, a mental picture of the malady is readily formed. The disease is furthermore quite characteristic, so that when all the pertinent factors of the syndrome are intelligently considered an error in diagnosis is not apt to be made. Acne may somewhat resemble the disease. However, in acne the eruptions are not crowded together, as in eczema, and the skin between the eruptions is normal, whereas in eczema it is not apt to be.

Ringworm may be ruled out by absence of fungi and broken hairs. In eczema the hair falls out entirely and no broken stumps are present, especially in the seborrheic form and, finally, ringworm is contagious. Contagious pustular dermatitis is distinguished from eczema by its highly contagious nature and by

the fact that in the former the vesicles form on small elevations in the skin, whereas in eczema this is not noted.

Treatment: The treatment of eczema combines both local and systemic measures. Hygiene and sanitation should receive attention. The nature of the affection should be studied and all possible external factors which might be incriminated should be carefully considered. If external causes can not be found the diet should receive attention and the presence of debilitating diseases considered as possible predisposing factors. Systemic medication should include the administration of a laxative and a course of arsenic. The form of external medication depends upon the type and stage of the disease. In the acute form soap and water should not be used. Cleansing should be done with a 3-5% Burow's solution. Drying powders have been more efficacious in the hands of the writer than ointments, in the acute, weeping stage, especially in the beginning. A powder composed of the following ingredients, applied freely twice a day, is very efficacious:

Zinc Oxide	
Bismuth Subnitrate	aa 30
Salicylic Acid	10
Magnesium Silicate	60

Later an ointment, composed of the following, may be applied twice a day:

Liquid Pitch	10
Zinc Oxide Ointment	90

Chronic eczema is best treated with medicinal agents somewhat irritating in character. Water and soap may be used in this form of the disease and all scabs and crusts should be carefully removed. Following the cleansing operation the skin should be dried and if the surface becomes moist, from exudates, a powder serves very well. This is to be followed later by ointments and lotions. A very efficacious preparation for chronic eczema, and especially the variety commonly called "grease heel," is composed of the following:

Balsam Peru	10
Tinc. Benzoin Comp.	60
Alcohol (ethyl)	30

The above is the proportion and any quantity may be made up. This is applied to the surface of the skin twice a day. Following

this, or used alternately, iodine and glycerin, in the following formula, may be applied twice a day.

Tinc. Iodin	30
Glycerin	60

It is, of course, obvious that the affected region must be protected from filth, moisture and the direct rays of the sun over long periods.

To be continued

SERUM PLANT DESTROYED

The plant of the Aurora Serum Company, located near North Aurora, Ill., was almost completely destroyed by fire, early on the morning of Sept. 13, 1924. Some of the smaller buildings of the old Fox River Packing Company nearby were also destroyed. The loss was only partly covered by insurance. Dr. L. B. Huff, president of the company, has already made plans to rebuild the plant, the new structure to be fire-proof throughout.

VISITORS AT THE JOURNAL OFFICE

During the past few months the following veterinarians have called at the JOURNAL office: Dr. Robert H. Sewell, of Fitchburg, Mass.; Dr. Walter Boyce, of Superior, Nebr.; Dr. Luther A. Maze, of Pontiac, Mich.; Dr. Alexander L. Copland, of Grosse Pointe, Mich.; Drs. S. Brenton, John Hoberg, Joseph Hawkins, E. P. Schaffter, A. C. Curtiss, A. S. Schlingman, S. R. Elkow and E. E. Patterson, all of Detroit, Mich.

THAT'S DIFFERENT

Doctor Brown sent a bill for ten dollars to the terrible-tempered Mr. Bangs. The bill read: "To services—\$10.00."

Bangs lost his terrible temper. He rushed to the doctor's office. "You're a robber!" he shouted. "Think of it, ten dollars a visit. It isn't worth it."

Doctor Brown rewrote the bill and sent it:

"To getting out of bed at 2:00 a.m.; answering phone; disturbing wife; dressing; going to garage; cranking 'tin Lizzie'; two-mile drive in cold; saving Fido's life; return to garage; waking wife; undressing; getting back into bed—\$10.00."

The bill was promptly paid with apologies.

SOME VETERINARY REMINISCENCES

V. A Visit to a Prairie Dog Town

By N. S. MAYO, Chicago, Ill.

To some of my research work, of more than thirty years ago, I can still "point with pride." Loco disease was a subject of much speculation and weird tales. From my observations, I concluded it was due to malnutrition. We did not know anything about "deficiency diseases" then, and I do not think that any other causative factor has been demonstrated. I also published the first description of cattle scab in the United States. I was called to investigate a skin disease among cattle on a ranch that comprised the site of old Fort Larned, on the Pawnee River, one of the frontier military posts that protected the Santa Fe Trail from the Indians. The ranch boss lived in the commanding officer's quarters, and the barracks were stables and sheds. The skin disease was called "Texas itch" by Kansas cattlemen, and was said to come from Texas. In Texas, they called it "Mexican itch," and the Texans said it came from Mexico. The "itch" proved to be cattle scab, and was soon generously distributed through the Great Plains region.

There was in those early days a very strong feeling among veterinary research workers that the United States Bureau of Animal Industry took an antagonistic attitude to any research work that was done outside of the Bureau, and it was rare that the Bureau gave any credit for work to an outsider. Happily, the attitude that all-important knowledge of animal diseases was confined to the Bureau of Animal Industry has passed, and now I feel that there is a spirit of cooperation and a desire to give credit to other workers that makes for harmony and progress.

Calls for assistance frequently came from big "cow outfits," and I have spent many interesting days with the "punchers," eating from a "chuck wagon," smoking around a campfire, and sleeping, or trying to, on the ground, wiggling between the bunches of buffalo grass that felt as big as mountains and as sharp.

On one occasion, I was called to a ranch in the remote southwestern part of the state. In those "good old days" one had a pocket full of railroad passes. When the conductor glanced

at mine and I told him where I wanted to stop, he said, "It's a big town." As the stop was a flag station, on an uncertain branch, I asked him how large it was, and he replied, "About a thousand, but they are all prairie dogs." The conductor was correct. The only edifice in sight was a cattle-loading chute, not a house nor a human. I felt rather isolated as the train pulled away and the few passengers were waving elaborate and suggestive farewells.

After waiting an hour or so, I saw a cowboy a mile or two away and attracted his attention. He lived in a dugout and belonged to another outfit, but offered to take me eleven miles to the ranch which I was to visit. He had two horses, but only one saddle. He let me use it, while he rode bareback. When we got to the ranch and I asked him how much I owed him, he said, "Fifty cents will be about right." When I urged him to take more, he said he had had a good time as he did not get a chance to talk to anybody very often.

In 1896 the Populist political party was successful in the elections, and in 1897 I was dismissed, with a dozen or more professors and teachers, from the Agricultural College. I went to Cornell University, to take post-graduate work, but was soon offered a position in the Connecticut Agricultural College, where I spent four very pleasant years, and the Populist bubble having "bust," I was re-employed at the Kansas Agricultural College and Experiment Station.

In closing these rambling reminiscences, some of the most pleasant memories are of the boys and girls whom I met as students, some of whom studied veterinary science and have made a place for themselves in our profession, among whom are Drs. Kinsley, Bourne, Birch, Johnson, the Joss brothers, Conrad, Logan, and others, of Kansas; Drs. Way and Dimock, of Connecticut; Luaces, of Cuba; and Lockhart, Ellett, and Givens, of Virginia. After all, our most valued possessions are friends.

JUST FOR A STARTER

Mother-in-Law: "The doctor said I was all run down and needed strychnin as a tonic. Now I don't want to take too much. How big a dose do you recommend?"

Son-in-Law (hopefully): "I wouldn't take more than a teaspoonful to begin with."—*Western Druggist*.

A GLIMPSE OF VETERINARY CONDITIONS IN THREE SOUTH AMERICAN COUNTRIES

By EDWARD A. CAHILL, Zionsville, Ind.

Director, Pitman-Moore Biological Laboratories

During a three-months trip to South America, I was afforded an exceptional opportunity to study the various phases of veterinary activities as well as agricultural conditions in those countries which border the South Atlantic Ocean.

Speaking generally, such a trip fills one with surprise and admiration. Our South American neighbors live under entirely different environments and their customs are so different that one cannot judge their progress by our standards. In the countries of Brazil, Uruguay and Argentina, racial characteristics are entirely different and the lineage of each race has an important bearing on the customs and conditions which prevail. The possibilities of agricultural and live stock development are so marvelous that the future of these industries can hardly be visualized but it may safely be predicted that at some time in the future these countries, particularly the Argentine, will be strong contenders for the world's trade in the products produced by the agriculturist of this country.

In typical traditional fashion, South Americans were courteous and polite almost to a fault. Even when our efforts to converse in their language became humorous even to us, there was not the slightest indication of amusement or intolerance on their part. We were particularly impressed with the length of time required to accomplish anything in South American countries. American hustle, brusqueness and lack of politeness is neither understood nor liked and I was frequently told that they work to live, while we live to work.

The larger cities are beautiful and living conditions are not unlike our own, but in the rural districts (campo) everything is most primitive and from our point of view undesirable.

Considering South American countries as a whole, the veterinary profession is entirely different than American veterinarians commonly suppose. The difference is entirely in favor of the former since the average veterinarian is an exceedingly high type of professional man. This is particularly true in the Argentine and Uruguay, where most veterinarians are well educated, not

only in veterinary medicine, but also in the languages and arts. The majority of those whom I met could speak at least two languages in addition to their own.

The greatest surprise which I encountered was during my visits to the veterinary colleges. These institutions are all maintained by the national governments as part of national universities and, with the exception of Brazil, they are splendid monuments to the profession. La Escuela de Veterinaria, at Montevideo, Uruguay, consists of several buildings which for sheer beauty cannot be equalled in North America. The National Universities at Buenos Aires and La Plata, Argentina, as well as at Montevideo, have exceptionally fine modern equipment as well as most capable faculties. The faculties are composed of many natives while a considerable number of Germans and other European veterinarians are to be found. The dearth of students in veterinary colleges is not confined to the United States. All of the South American schools are having the same difficulty in spite of free tuition. I saw an anatomy class of two students with three instructors.

Conditions are not particularly favorable for practitioners. Living conditions in the rural districts are not attractive and live stock is very cheap. A reasonably good horse can be bought for 100 pesos or \$35.00 American gold, while good milch cows were sold during the winter for \$8.00 gold. Swine are selling much higher proportionately and since corn can be raised very cheaply, this branch of the live stock industry is prospering. A scarcity of hogs has resulted in the importation of these animals for slaughter, into both the Argentine and Uruguay, from Brazil. Live stock owners are sometimes 300 miles from the nearest veterinarian. These combined conditions do not tend to make country practice attractive or profitable. A large percentage of veterinarians in the country are retained on a small yearly salary by the government and have a little practice on the side. In the cities there is some small animal practice while the large number of horses makes considerable equine practice. I did not see a modern, privately-owned, veterinary hospital in any of the three countries.

Dairy animals are kept under very poor sanitary conditions and a good milk supply, according to our ideas, is unknown. In the country animals are driven many miles to trains and those which die en route are simply left where they drop. It is not

uncommon to see fifteen or twenty carcasses along the road during a forty-mile drive.

Foot-and-mouth disease is very common in the Argentine and is greatly feared, not for the deaths which it causes, but for the loss in weight which is associated with an outbreak. Many owners expect a visit of this disease at least once per year. Hog cholera is prevalent in the Argentine but is practically unknown in Uruguay and Brazil. Texas fever in Brazil is a serious problem, while anthrax and blackleg are amongst the most prevalent diseases in all three countries. Parasitic infestations are not nearly as serious as in this country, probably due to the large range areas.

Even the briefest review of South American conditions would be incomplete without a few words of praise of the Section of Sanitary Police, Department of Agriculture of the Argentine. The "Jefe" (chief) of this section, Dr. Fernandez Beyro, is a brilliant veterinarian who is devoting his life to building up an efficient organization for the control of live stock diseases. In a general way the above-mentioned section is similar to our Bureau of Animal Industry including an exceptionally good meat inspection division as well as quarantine, stock-yards inspection, milk and butter inspection and educational divisions. The accomplishments of this section, under the leadership of Dr. Beyro, which have been obtained in the face of many natural and political handicaps, will eventually mark him as one of the world's outstanding veterinarians.

It will interest the profession to know that Dr. Jose Polero, of Uruguay, who visited this country a few years ago, has organized an efficient veterinary corps in his country. He has been promoted to the rank of lieutenant-colonel and, in addition to his close association with the Minister of War, still maintains his duties at the college.

I was particularly impressed by the lack of American text-books and journals in the libraries of the veterinarians who read English. Inquiry revealed that in every instance our South American confreres state that in their opinion American text-books and journals are not the equal of those published in Europe and particularly by the French. Their friendly criticism was that our journals print too much material which is of slight value and too little which is new or helpful. Regarding our text-books, they maintain that few are original but that many

are largely compilations of material to be found in previously-existing books.

Many of the South American veterinarians requested that their respects be presented to the veterinarians of the United States.

I tender their felicitations with the knowledge that the distance between their countries and ours deprives us of an association from which we would profit greatly.

MILK OUR MOST IMPORTANT FOOD

There are almost 130,000 babies born in New York City every year. Of this number, 64 in every thousand die before they are one year old. According to the statistics of the Bureau of Child Welfare, almost 40 per cent of the babies are bottle fed. In other words, because the mother is unable to nurse her offspring, 40 per cent of the babies are dependent upon cow's milk for life. From birth until about two years of age, the diet of the infant consists almost entirely of cow's milk.

From these figures, it will be seen that there are almost 200,000 babies dependent entirely upon cow's milk for life. This fact, alone, indicates the importance and necessity for a close supervision of the milk supply, especially when it is considered that while milk is our most important food, it is also the food which may be most easily contaminated.—(*Monthly Bulletin, N. Y. City Dept. of Health*).

NEW BULLETIN ON POISONOUS PLANTS

Under the title, "Poisonous Plants of Alabama," a very comprehensive bulletin recently made its appearance from the Live Stock Sanitary Department of the State Board of Agriculture of Alabama. The bulletin consists of 42 pages and is very well illustrated with cuts of forty different poisonous plants. The authors of this valuable contribution are: Dr. C. A. Cary, State Veterinarian of Alabama; E. R. Miller, Chemist and Pharmacist; and G. R. Johnstone, Associate Botanist. The latter author is responsible for the botanical names, descriptions, and cuts for the recognition of the various plants covered in the bulletin. Dr. Cary and Mr. Miller have contributed the material covering toxic or active principles; toxic parts; toxic actions; symptoms and lesions; susceptible animals, and treatment. This bulleting should be in the hands of every veterinarian in the Southern States.

CLINICAL AND CASE REPORTS

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

PARALYSIS IN A ROOSTER DUE TO PARASITES

By J. H. RIETZ, *Columbia, S. C.*

A Rhode Island Red male bird was received at the laboratory of the Live Stock Sanitary Department of Clemson College, Columbia, S. C., for examination, diagnosis, and treatment. The bird was in a partially paralyzed condition, unable to stand or change position other than turn an occasional backward somersault and again assume the position seen in fig. 1.



FIG. 1. Bird as presented for treatment.

A general routine examination was made, including a fecal examination, which showed a very heavy infestation with eggs of *Trichosoma contortum*. In the absence of any other cause for the condition of the bird, treatment was begun to relieve the parasitic infestation, by giving 2 cc of a mixture of equal parts of turpentine and raw linseed oil, twice daily and continued for a period of seven days. At the end of this period, there was no change in the condition of the bird or reduction in the number of parasite eggs in the feces.

By way of drastic treatment, 30 cc of the turpentine and linseed oil mixture was now given at one dose, with the result that the bird showed marked improvement by the second day (fig. 2),

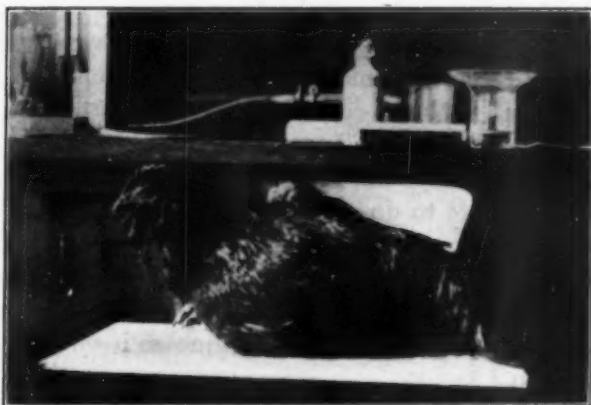


FIG. 2. Partial recovery on second day

the bird then being able to take food and water without assistance. On the fifth day following the large dose of the turpentine-linseed oil mixture, the bird was practically normal (fig. 3), and fecal examination failed to show the presence of parasite eggs.

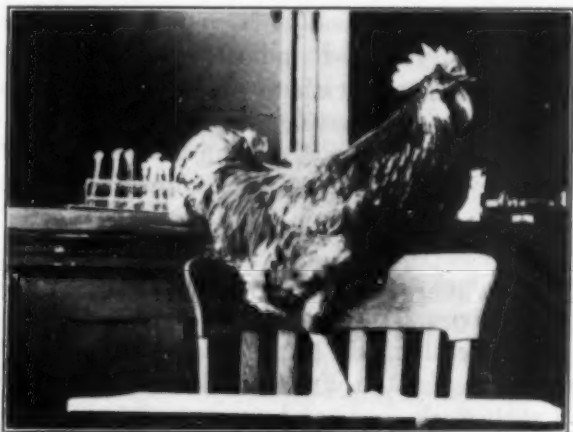


FIG. 3. Practically recovered on fifth day

Water and food were forcibly given during the first nine days after the bird was received at the laboratory.

HYPODERMA IN TEAT OF COW

By ERNEST H. HOUCHIN, *Mt. Vernon, Wash.*

I had an interesting case the other day that I thought might be of interest to the readers of the JOURNAL.

Having been called to a certain farm to treat some cows, after I finished, the owner had me look at a cow that had a lump in the teat canal. This lump could be moved up into the milk-well and the quarter could be milked easily.

I tried to remove the lump, through the natural opening of the teat, but was unable to do so. As the cow had been milked an hour or so before my arrival, I had the milker try to milk it out while the udder was full. The next morning the milker came into the office with a *Hypoderma lineatum*, or common grub, all intact. He said that he managed to squeeze it out alive, but it was dead when I saw it..

Having never read nor heard of such an occurrence before, I thought that it might be of interest to show how widely distributed throughout the body this parasite may be found.

REGIONAL ANESTHESIA

In injecting butyn, or other local anesthetics, particularly for neurectomy, it is best to use a syringe with a glass barrel or else insert the needle first and note whether blood is discharged through the needle. If blood is discharged either through the needle or into the syringe, it indicates that the needle is in a blood vessel, and a local anesthetic should never be injected into a blood vessel when attempting regional anesthesia.

N. S. M.

A CONTRAST

A proposed county health unit was indefinitely tabled by the Board of Supervisors of Christian County, Illinois, at their meeting in Taylorville, July 17, 1924. Under the plan all health work would be under the direction of a health officer specially trained in such work, assisted by a corps of nurses. The total cost to the county was estimated at about \$5000 annually. At the same meeting it was decided to employ a county veterinarian next year, in connection with tuberculosis eradication work, although the amount of tuberculosis infection in the county is reported to be only 1.45%.

REVIEWS

MILITARY MEAT AND DAIRY HYGIENE. Capt. Horace S. Eakins, V. C., Med. Dept., U. S. Army. 672 pages, 6x9, with 62 figures in the text. Williams and Wilkins Company, Baltimore, Md., 1924. Price, cloth, \$6.50.

This volume has been compiled under the direction of the Surgeon General, mainly for the information of and use by the personnel of the Veterinary and Sanitary Corps of the Medical Department of the U. S. Army, in their work of examining food products of animal origin intended for consumption by the Army. To the uninitiated the ramifications of this food inspection service, as revealed by the manual, are quite a revelation.

The scope of the book is shown, in part, by the ground covered in some of the chapters, which deal with slaughter, antemortem and postmortem inspection of food animals, general inspection of the products, in the form of fresh, cured and canned meats, rendered meat products, sausage, poultry, eggs, fish and seafoods, milk (fresh, condensed, powdered, and malted), ice cream, butter and cheese.

Extreme thoughtfulness and the proper sense of appreciation, upon the part of the author, were shown in dedicating this book to the memory of Major George A. Lytle, V. C. It was under his direction that almost two billion pounds of meat received expert inspection by the Veterinary Corps during the late war. In this connection Major Lytle really rendered an inestimable service to his country, in the face of the greatest difficulties, and it is probably no exaggeration to say that Major Lytle built much of the foundation upon which this latest contribution to our veterinary literature has been constructed.

VETERINARY MATERIA MEDICA AND THERAPEUTICS. E. Wallis Hoare, F. R. C. V. S. 4th edition, edited and revised by J. Russell Greig, M. R. C. V. S., Professor of Medicine, Royal (Dick) Veterinary College, Edinburgh. 664 pages. Alexander Eger, Chicago, Ill., 1924. Price, cloth, \$5.50.

The fourth edition of this well-known book has been revised and edited by Professor Greig with a great deal of care. While the general scheme of previous editions has been retained, the section on wound treatment has been omitted, as belonging more

properly to a work on surgery. The section on materia medica has been enlarged.

Part I (almost one-fourth of the book) covers diagnosis, symptoms, care, management and nursing, actions and uses of drugs, prescription writing, administration of medicines, pharmacy, etc. Part II covers Materia Medica, Vaccine and Serum Therapy. Part III treats of the special therapeutics employed in diseases of the various systems and organs of the body.

An appendix includes something over a hundred formulæ for various uses. The book is well indexed, the references being to both drugs and diseases.

Examination of the text reveals that the author does not accept *B. bronchisepticus* as the cause of canine distemper, but assigns to this organism the role of an important secondary invader, with which opinion many will agree. In the discussion of black-leg vaccines the aggressin is not mentioned although this product has been in use since 1919 and about 20,000,000 doses have been produced in this country. A strong inference is given that satisfactory results are being obtained with killed organism "vaccines" for abortion, and especially so with living cultures, under carefully prescribed conditions. The chapters on anthelmintics is right up to date, with the latest recommendations for the use of such drugs as arecolin hydrobromid, carbon tetrachlorid and oil of chenopodium.

DEPUTY MILK CONTROL OFFICER

Mr. Samuel M. Heulings, formerly Dairy Engineer of the Sheffield Farms Co., Inc., New York City, a dairy engineer of international reputation, has affiliated himself with the Board of Health of Lower Merion Township, Penna., through his recent appointment as Deputy Milk Control Officer. Mr. Heulings is giving, in the interests of public health, a knowledge acquired from many years of experience in practical milk-plant operation.

Mr. Heulings' principal efforts will be directed in assisting Dr. George W. Grim, present Milk Control Officer, in securing complete enforcement of regulations of the Lower Merion Board of Health, concerning pasteurization. The Pennsylvania State Department of Health requires that all milk, to be sold as pasteurized, be heated to a minimum temperature of 145° F. and held at not below that temperature for a minimum period of thirty minutes.

ASSOCIATION MEETINGS

STATE VETERINARY MEDICAL ASSOCIATION OF TEXAS

The fourteenth annual meeting of the State Veterinary Medical Association of Texas was held at Brownwood, Texas, June 25-26, 1924, with over 100 members in attendance. About thirty of the veterinarians were accompanied by their wives, who held the second meeting of the Ladies' Auxiliary.

A very interesting literary program had been arranged, and was presented as follows:

"Equine Influenza," by Dr. Otto Wolfe, Big Spring, Texas.

"Rabies in Animals," by Dr. A. A. Lenert, College Station, Texas.

"Cooperation and Business Methods for Veterinarians," by Dr. H. L. Blackburn, Fort Worth, Texas.

"Parasites and Parasitic Diseases of the Hog," by Dr. E. W. Price, College Station, Texas.

"Range Treatment for Parasites of Sheep and Goats," by Dr. D. H. Bennett, Sonora, Texas.

"Foot-and-Mouth Disease," by Dr. Walter J. Crocker, Fort Worth, Texas.

A resolution was adopted endorsing and recommending the single-injection rabies vaccine for the preventive treatment of rabies in animals.

A grand banquet was held Wednesday evening, at the Southern Hotel. Dr. Walter J. Crocker, of the Globe Laboratories, Fort Worth, Texas, acted as Toastmaster and performed like a "Harry Lauder." About 190 attended the banquet. Short addresses were made by the old and new officers of the Association.

On Thursday, a very interesting clinic was held. Lt.-Col. Ray J. Stanclift, V. C., Fort Sam Houston, Texas, second ranking veterinary officer in the U. S. Army Veterinary Corps, assisted by Drs. W. G. Gregory and Walter J. Crocker, of Fort Worth, Texas, conducted the large animal clinic. Drs. R. P. Marsteller, of College Station, and M. A. Peck, of Fort Worth, conducted the small animal clinic.

The members voted to hold the second semi-annual meeting at Houston, Texas, in January, 1925, and the fifteenth annual meeting at College Station, Texas, in June, 1925.

Officers for the ensuing year were elected as follows: President, Dr. H. L. Blackburn, Fort Worth; First Vice-President, Dr. W. R. Sanderson, Brownwood; Second Vice-President, Dr. D. Pearce, Leonard; Secretary-Treasurer, Dr. F. S. Palmer, Dallas.

F. S. PALMER, *Secretary-Treasurer*.

IDAHO VETERINARY MEDICAL ASSOCIATION

The fourth annual convention of the Idaho Veterinary Medical Association was held at Lewiston, Idaho, July 14-15, 1924.

The meeting was called to order by the President, Dr. Ray B. Hurd, of Payette, who spoke briefly on the importance of the Association to the profession, and the benefits to the individual practitioner derived from personal contact with one another, and the technical knowledge gained from the clinics, and the discussion of vital problems encountered in active practice.

Mayor Thompson extended the Association a hearty welcome, and Dr. J. C. Sorensen responded.

Dr. Susan Bruce, of Lewiston Health Department, read a paper on "Animal Diseases Transmissible to Humans," and her paper went considerably into details concerning the problems of the medical profession and health departments. A unanimous vote of thanks was extended the essayist for her contribution to the program. In the discussion which followed, Dr. J. R. Fuller, of Walla Walla, Wash., reported a case of human anthrax, contracted by one of his clients, from a cow.

Dean E. E. Wegner, of Pullman, Wash., gave a splendid address on veterinary educational matters. He brought out the point that the professional man has been going through a depressed period, and that conditions have been no worse for veterinarians than for members of other professions and businesses. Dr. Wegner stated that present conditions lessened the incentive for young men to enter veterinary colleges. This will result in a lack of veterinary services adequate to care for the needs of the many thousands of domestic animals, there being over a million dollars' worth of live stock to each veterinarian at the present time, and the outlook is that the services of veterinarians will be more in demand in the future than ever before.

A paper entitled, "Sclerosis of the Liver, or Walking Disease of the Horse," prepared by Dr. H. A. Trippeer, of Walla Walla, Wash., was read by Dr. J. R. Fuller. This subject was of unusual interest to the veterinarians present, and Drs. A. R. Galbraith, J. E. McCoy, W. Wilson, and C. N. Nye participated in a very animated discussion.

Dr. A. R. Galbraith, of Garfield, Wash., presented a paper entitled, "The Veterinarian's Interest in Animal Husbandry." The subject was handled very creditably by the author, and a splendid discussion followed. Dr. Galbraith made it clear that it is practically impossible for every practitioner to be an expert in animal husbandry. He did not believe that it was necessary, but he thought that every practitioner could familiarize himself with a great many of the stockman's common problems, and he should be able to assist the stockman in solving any problem dealing with breeding and feeding.

Dr. J. E. McCoy, of Pullman, Wash., presented a splendid paper entitled, "Organic Changes Found in Sterility of Cattle." A paper on the subject of "Hemoglobinuria in Cows Due to Heavy Feeding and Parturition," prepared by Dr. S. E. Nelson, of Preston, Idaho, was read by Dr. McCoy. The paper brought out much interesting discussion, as the disease has made its appearance in several districts in the state, especially in the beet-raising districts, where beet pulp is fed.

After a short business session on the second day, the balance of the time was given over to a sterility and abortion disease clinic, held at the Lewiston Dairy and at the Red Front Barn. In addition, there were spaying, caponizing, and ridgling operations.

Officers for the coming year were elected as follows: President, Dr. H. E. McMillan, of Filer; Vice-President, Dr. J. H. Plank, of Rupert; Secretary and Treasurer, Dr. J. D. Adams, of Boise.

The Association went on record as unanimously favoring and supporting the other western associations in their invitation to have the next annual meeting of the A. V. M. A. held in one of our western cities.

J. D. ADAMS, Secretary and Treasurer.

MARYLAND STATE VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the Maryland State Veterinary Medical Association was held at the University of Maryland,

College Park, Md., on July 17-18, 1924, with about seventy members and visitors present.

The meeting was called to order by the President, Dr. C. M. Grubb, of Rockville, Md. The first morning, the members, as well as the Ladies' Auxiliary, listened to an address of welcome by Dr. A. F. Woods, President of the University of Maryland. This was followed by a response and the address of the President. Both of these talks were unusually good. The remainder of the forenoon was given over to a business meeting. The two outstanding features of this meeting were the addition to our roster of twelve new members, and the passage of a resolution by the Association recommending a scale of prices for tuberculin testing in accredited herd work in the State. This resolution is as follows:

WHEREAS, The Federal and State plan for the eradication of bovine tuberculosis necessitates the tuberculin testing of accredited herds by local practitioners who have been accredited to do such work, and

WHEREAS, The Association has at its annual meetings for several years suggested that the accredited veterinarians agree upon and establish a scale of prices to be charged accredited herd owners for testing their herds, and

WHEREAS, In the judgment of the Executive Committee, after consultation with a number of the accredited veterinarians of the state, it is now necessary for the protection of the veterinarians of Maryland to take some action, therefore, be it

Resolved, That the following scale of prices be adopted by the Association:

1. Intradermal or intradermal and ophthalmic method: The regular charge for a professional visit for each visit, plus 25 cents a head for each head tested.

2. Where there are two or more herds in the same locality that can be handled practically at the same time, the veterinarian can make the necessary adjustment to apportion the visit charges to his several clients in accordance with the number of cattle in the respective herds.

3. In the testing of herd additions, \$1.00 a head in addition to the regular visit charge should be considered a fair price. Should, however, a considerable number of cattle be tested for herd additions, the regular charges, as specified in paragraphs 1 and 2 in this scale of prices, should be made.

4. Subcutaneous method: A minimum charge of \$15.00 should be made for tests by this method, and the veterinarian should be governed in making his charges by the circumstances in connection with each individual herd, such as bad roads, loss of time from his regular practice, etc. The regular visit charge, plus \$1.00 a head, should apply in ordinary cases. In large herds, the \$1.00 per head rate should be reduced by agreement with the owner, so that no excessive charge will be made, and be it further

Resolved, That a copy of this resolution be sent to each accredited veterinarian in the State of Maryland, and the Secretary shall instruct each member of this Association that the foregoing scale of prices has been adopted by this Association, and that for the good of the profession he will be expected to abide by the action of the Association, and make his charges in accordance with this scale of prices.

After the luncheon at the University Dining Hall, Dr. F. C. Ryan, of Middletown, Md., demonstrated the caponizing operation on several birds. This was followed by a number of opera-

tions on dogs by Dr. Diabbel, of Baltimore. The last feature of the afternoon clinic was a postmortem and vaccination demonstration on hogs by Dr. I. K. Atherton, U. S. B. A. I. Inspector, College Park, Md.

At 6 o'clock Lt. Col. W. P. Hill, Commandant, Army Veterinary School, Washington, D. C., addressed the Association on "The Veterinary Reserve Corps." A banquet was held in the University Dining Hall at 7:30 o'clock. After the menu had been served, our toastmaster, Dr. Hulbert Young, of Baltimore, took charge of the ceremonies. The speakers introduced were as follows: Honorable S. M. Shoemaker, President of the Board of Regents, University of Maryland; Dr. A. F. Woods, President of the University of Maryland; Dr. T. B. Symons, Director of Extension, University of Maryland; and Mr. J. J. Sweeney, of Baltimore, Md. The music was furnished by the Radio Trio, of Washington, D. C.

The morning of July 18th was devoted to a paper by Dr. R. C. Reed, of College Park, Md., on "Abortion and Sterility," and the clinics. The special features of the clinics were the cryptorchid and fistulous withers operations, both by Dr. R. V. Smith, of Frederick, Md. After luncheon, Captain R. A. Kelser, of the Army Medical School, Washington, D. C., held a two and a half hour demonstration on the application of roentgenology in veterinary medicine. The meeting adjourned at 4:30 o'clock.

E. M. PICKENS, *Secretary-Treasurer.*

MONTANA VETERINARY MEDICAL ASSOCIATION

The sixteenth annual meeting of the Montana Veterinary Medical Association was held in Helena, July 25-26-27, 1924. The meeting place was the laboratory of the Montana Live Stock Sanitary Board, at the Capitol.

The opening address of the session was made by Governor Joseph M. Dixon, and was responded to by the Vice-President of the Association, Dr. H. F. Wilkins. The President's address was made by the retiring President, Dr. W. C. Orr, who spoke particularly of the outbreak of foot-and-mouth disease in California, Dr. Orr having spent the winter in that state.

The principal address of the opening session was that of Dr. H. F. Wilkins, who gave a very interesting discussion of "Foot-and-Mouth Disease and the Methods of Control Used in California." Dr. Wilkins was on a vacation in California when the

disease broke out, and obtained permission from the State Veterinarian of Montana to work on the California force. He worked several months, and was of much assistance, on account of his familiarity with handling stock on the range.

The evening of the first day was devoted to an address by Dr. W. J. Butler, State Veterinarian, on "Dairy Inspection in Montana," and a general discussion of this subject followed.

At the morning session of the second day, Mr. W. S. Custer, of the Montana Silver Fox Company, of Missoula, spoke on "The Silver Black Fox Industry." The paper was followed by a discussion of methods of controlling parasitism in foxes. "Poisoning by Damaged Sweet Clover" was discussed by Dr. A. D. Knowles, of Missoula. During the past year there have been several losses in cattle, at different points, which were apparently due to this cause.

Dr. Howard Welch, of the Montana State College, spoke on "Mineral Deficiency Diseases," referring particularly to bone-chewing cattle and goiter, due to lack of iodine. Dr. J. H. Shoemaker, Acting Inspector-in-charge of the U. S. B. A. I. in Montana, presented a paper giving the status of cattle scab eradication work in Montana.

The afternoon of July 26 was devoted to practical dairy inspection, at several dairies in the Helena Valley, with a discussion of the score card for each place.

The final business session was held the evening of July 26. At this meeting, it was decided to make Helena the permanent meeting place of the Association. The new officers elected were: Dr. H. F. Wilkins, of Lewistown, President; Dr. E. D. Nash, of Helena, Vice-President; and Dr. Hadleigh Marsh, of Helena, Secretary-Treasurer.

On the third day of the meeting, the Montana veterinarians took a well-earned holiday, making the boat-trip through the canyon of the Missouri River at the Gate of the Mountains.

HADLEIGH MARSH, *Secretary-Treasurer.*

WASHINGTON STATE VETERINARY MEDICAL ASSOCIATION

The Veterinary Medical Associations of Oregon, Washington, and British Columbia met together in convention, at the Tacoma Hotel, in Tacoma, Wash., for a three-day session, on July 29, 1924. There were about forty-five men present at the opening

session, with Dr. H. A. Trippeer, of the Washington Association, presiding. More men came at intervals during the convention, until there were some sixty-five or seventy in attendance. Dr. Engels, of the City Board of Health, made some brief remarks, and called on Congressman Albert Johnson for an address. Dean Wegner, of the State College, gave an address in reply. Dr. Trippeer gave an address touching on several matters pertaining to the standing of our profession.

Dr. L. A. Merillat, of Chicago, then gave a lengthy discourse on "The Future of the Veterinary Profession," in which he gave some wholesome advice and sounded a note of warning to those who do an inferior class of work. His address was discussed by Dr. Wegner, who made a plea for more students. He asked that practitioners make it a point to try to get good high school students interested in veterinary studies. Dr. P. G. MacKintosh presented a paper on "Cesarian Section," before adjournment for lunch.

Convening again at 1:50 p.m., the entire afternoon session was taken up by four papers, all touching on sterility in dairy herds. These papers were contributed by Drs. E. A. Schmoker, Julian Howard, J. E. McCoy, and Robt. McBride. Discussions indicated a wide interest in what had been presented. Dairy practice constitutes a large part of veterinary work in this locality.

The evening session was held in the Chamber of Commerce rooms. Dr. J. G. Jervis, Milner, B. C., presented an illustrated article on "Hypoderma Anaphylaxis."

Dr. Merillat gave the principal address of the evening, in which he touched on many points of particular interest to the practitioner, bringing out many details of some of the newer veterinary operations in use by the most progressive veterinarians. This lecture was particularly interesting to the practitioners present.

On the following morning, Dr. A. J. Damman, of Vancouver, B. C., read a paper on "The Assistance of the Veterinarian to the Producer of Milk for Home Consumption." This topic also brought out a lengthy and varied discussion. It was followed by an address on "The Public Health League," by Dr. Engels, in which he made an appeal for the cooperation of the veterinarians. The appeal was referred to the Executive Committee.

The convention then adjourned for business meetings of the separate associations.

In the afternoon, the time was devoted to clinics held at the Western Washington Experiment Station, at Puyallup, a small town a few miles out of Tacoma. The session was called to order by Dr. J. W. Kalkus, of the Station, who introduced Prof. Linklater, the superintendent of the Station. He made some brief remarks setting forth the object and activities of the Station, and extended a welcome to all.

Dr. W. T. Johnson, Station Veterinarian, conducted a poultry clinic, in which he gave an address and some demonstrations. The small animal clinic was in charge of Dr. O. G. Button, of Tacoma, and Dr. E. A. Ehmer, of Seattle. Dr. T. B. Carter, of Portland, Ore., also gave a demonstration of bandaging. Dr. Merillat gave demonstrations of dental anesthesia, and operated on a "roarer" in the standing position. He also demonstrated some methods of restraint.

Dr. F. W. Miller, of Corvallis, Ore., had charge of the cattle clinic, along with Dr. E. A. Schmoker, of Monroe, Wash. Dr. Miller demonstrated blood-drawing, and Dr. Schmoker handled some sterility work. Miscellaneous cases were submitted to various members present.

A banquet was enjoyed at the Tacoma Hotel in the evening.

The morning session of the third day was called to order by Dr. H. A. Trippeer, who presented Dr. W. Graham Gillam, Cloverdale, B. C. Dr. Gillam is Secretary-Treasurer of the British Columbia Veterinary Medical Association, and enjoyed several years of practice in England before coming to this country. He presented an interesting paper on "Some Notes on the Possible Toxic Action of Fresh Water Algae." This paper brought out some interesting discussion. At its close, Dr. Merillat was given the floor for a few minutes for the purpose of making a memorial presentation to Dr. R. E. Gray, one of the Canadian members present. He called Dr. Gray forward, and in a dignified and appropriate manner expressed his high esteem for him and his contemporaries, begging the privilege of bestowing this gift memorial. At the same moment, he drew from his pocket a brightly painted tin monkey, so arranged that it would climb rapidly up a taut string. Dr. Gray accepted the gift amid great laughter, and, after a moment of some embarrassment, very cordially and fluently replied to Dr. Merillat, promising to bring the "mascot" to all future meetings, provided he could pass veterinary inspection at the boundary line.

At this point, the program was suspended and business matters taken up.

In the afternoon, there were papers presented, with Dr. Miller presiding. Dr. R. J. Donohue also occupied the chair a part of the time.

Dr. Merillat gave a lengthy address on "Unsuccessful Operations." He said his text was: "Fools enter where angels fear to tread." Dr. E. R. Derflinger, Eugene, Ore., read a paper on "The Chemistry of Tuberculin."

Dr. L. C. Pelton, Olympia, gave a talk on "Foot-and-Mouth Disease, with Particular Reference to the Present Outbreak," and Dr. T. B. Carter, Portland, read a paper on "Auto Accidents Among Small Animals." Dr. R. A. Button, of Tacoma, gave a short talk on "Skin Diseases of Dogs."

CARL COZIER, *Secretary-Treasurer,*
Wash. State Vet. Med. Asso.

NORTH DAKOTA VETERINARY MEDICAL ASSOCIATION

On the morning of August 12, 1924, veterinarians from all parts of North Dakota gathered at the Veterinary Building of the Agricultural College, Fargo, N. D., for the twenty-third annual meeting of the North Dakota Veterinary Medical Association. Dr. A. F. Elliott, of Milton, N. D., President of the Association, opened the session at 9:30 a. m. In his address to the Association, Dr. Elliott strongly emphasized the victory which the horse is gaining over his greatest enemies, the tractor and the motor truck, and the commendable work of the Horse Association of America was warmly endorsed.

Dr. John Lee Coulter, President of the North Dakota Agricultural College, welcomed the visiting veterinarians to the institution and delivered an excellent address which analyzed the transitional period through which North Dakota agriculture is now passing. The great weed menace, which has greatly increased during the last few years, can be effectively combated only by the raising of cultivated crops and alfalfa, which will insure weed destruction and at the same time the land will be making returns. As such types of crops will require large numbers of farm animals for their consumption the raising of live stock will become much more extensive and this in turn will create a greatly increased demand for trained veterinary services. Dr. Coulter stated that

the prospects are to be exceedingly good for the practice of veterinary medicine in the state of North Dakota within the next decade.

The afternoon session was devoted to the addresses of two very prominent members of the veterinary profession, Dr. J. A. Kiernan and Dr. John W. Adams. Dr. Kiernan gave an excellent discussion of the progress which is being made in the nation-wide campaign for the control and eradication of bovine tuberculosis. By means of numerous charts the most salient features in connection with the work were given emphasis. Drs. W. F. Crewe, A. F. Schalk, and L. Van Es discussed Dr. Kiernan's paper in a very comprehensive manner and, as the hour was becoming late, Dr. Adams was introduced and the balance of the afternoon session spent in listening to his address upon "The Component Parts of Good Surgery." The pitfalls of surgical diagnosis were stressed in particular and Dr. Adams handled his subject in the clear-cut, free-flowing manner so characteristic of his discourse. The meeting was adjourned at 6:30 p. m.

The morning session of August 13 was opened by Dr. Adams, who performed several operations for the purpose of demonstration and discussion. A cesarean section and umbilical hernia operation upon the pig, and a double neurectomy of the plantar nerves, for the relief of a ringbone condition, consumed the major portion of the morning session. The balance of the program was devoted to demonstrations and lectures by various members of the Animal Husbandry Division of the College. The members gathered in the judging pavilion where Prof. E. J. Thompson demonstrated the various breeds of sheep which are raised in the Northwest, discussing the points which contribute chiefly to the value of each particular breed. He also gave an open-air discussion and demonstration of mares and foals.

Professor Christenson discussed results obtained from the experimental feeding of various kinds of silage; Professor Shepherd demonstrated and discussed the lard and the bacon types of hog upon alfalfa pasture; Professor Dice handled the subject of dairy cattle, while Professors O. A. Barton and J. R. Redditt conducted a demonstration upon poultry, dealing chiefly with types of the various breeds and the culling of flocks. These demonstrations were very interesting and instructive. The average veterinarian finds himself in hot water a good many times when he is confronted with questions concerning various problems in animal husbandry, and the time is at hand when the successful

practitioner will be required greatly to enlarge his grasp on this subject.

A short business session brought the meeting to a close, the principal business being the election of officers for the ensuing year. The results of this election selected Dr. J. V. Miles as the Association head for the year 1925; Dr. T. O. Brandenburg, Vice-President; Dr. R. S. Amadon, Secretary, and Dr. B. C. Taylor, Treasurer.

A rising vote of thanks was given the men who had so kindly contributed their services upon the program and made the meeting such a success. The convention adjourned at 5:00 p. m.

R. S. AMADON, *Secretary*.

FLORIDA STATE VETERINARY MEDICAL ASSOCIATION

The Florida State Veterinary Medical Association met in the College of Agriculture, University of Florida, Gainesville, Fla., August 13-14, 1924. There were about thirty members present, and a very interesting and instructive program was carried out. The program was as follows:

Address of Welcome, Dr. Wilmon Newell, Dean, College of Agriculture, Gainesville.

"The Veterinarian Who Succeeded," Dr. W. E. A. Wyman, Chief of Sanitation, St. Petersburg, Fla.

"The Excretion of Poisons through the Udder of the Cow," Dr. D. L. Campbell, Ft. Lauderdale, Fla.

"Field Observations of Hog Cholera and the Control of this Disease," Dr. H. C. Nichols, Ocala, Fla.

"Parasites." Question box discussion, Dr. Maurice C. Hall, Senior Zoologist, B. A. I., Washington, D. C.

"Veterinary Problems." Question box discussion of various veterinary problems members desired to bring before the Association, Dr. D. C. Gillis, Gainesville, Fla.

"Leeches in the Horse," Dr. J. K. Jones, Gainesville, Fla.

"The Milk Goat," Dr. W. P. Link, Tampa, Fla.

"Three Months' Research on Cattle Diseases in the Everglades," Dr. A. L. Shealy, University of Florida, Gainesville, Fla.

The Association was deeply indebted to Dr. Maurice C. Hall for his interesting and instructive discussion on "Parasites." The subject is a very important one to the Florida veterinarians and they will profit greatly by having heard Dr. Hall.

On Wednesday afternoon the Association enjoyed a picnic given by the University of Florida. On Wednesday night the annual banquet was held at the White House Hotel.

The officers of the Association are: Dr. J. V. Knapp, Talla-

hassee, President; Dr. W. P. Link, Tampa, Vice-President; Dr. A. L. Shealy, Gainesville, Secretary-Treasurer.

The Association will hold its next meeting some time during the winter months.

A. L. SHEALY, *Secretary-Treasurer.*

ONTARIO VETERINARY ASSOCIATION

The semi-centennial meeting of the Ontario Veterinary Association, which was held at Toronto, on August 13-14, 1924, was one of the most successful ever experienced in the history of the Association. The program committee, Drs. J. Brown, of Burford, and Dr. D. A. Irvine, of Toronto, are to be congratulated for the arrangement of it, and the thanks of the Association are also due to President Buckley and Secretary Glover for the orderly and timely manner in which the items were run off. The program was carried out under three headings, namely: Business, Addresses and Discussion, and Clinical.

The morning of August 13 was chiefly devoted to matters of business in connection with the Association. In the afternoon the addresses were given. The first one, by Dr. Ronald Gwatkin, of the Ontario Veterinary College, was an illustrated lecture on "Poultry Diseases." Dr. Gwatkin handled his topic in a general way, emphasizing methods of prevention and control and referring to detail only in matters of importance. The pictures thrown on the screen were greatly appreciated by the audience and served to illustrate the address in a very practical manner.

"Auricular Scabies (Parasitic Otitis) in Ranch-bred Foxes," the next topic on the program, was also an illustrated lecture, by Dr. J. A. Allen, of the Fox Research Station, Charlottetown, P. E. I. In his address Dr. Allen explained the manner in which these parasites affect the ear, also the diagnosis and treatment. "Experiences with Biologies in Bovine Abortion Disease," by Dr. F. Page, of St. Mary's, Ont., was a subject of considerable interest, and was well received.

For the 50th Anniversary of the Association a very fitting address was delivered by the only living charter member of the Association, Dr. Joseph Hawkins, of Detroit, Mich. Dr. Hawkins entered the Ontario Veterinary College in 1868 and was graduated in 1870. His address was full of reminiscences and historical data and this venerable member of the profession clearly showed that he had kept pace with the advancement of veterinary

science in his 55 years of activity. In concluding his address he presented the Association with a gavel, made by Dr. G. B. Cash, of Alexandria, Ohio, from a piece of the old Ontario Veterinary College, Temperance Street, Toronto.

"Spermatogenesis in the Bull, with Some References to the Diagnosis of Impotency," was the title of an interesting address by Dr. H. E. Batt, of the Ontario Veterinary College.

The evening session commenced at 7 p. m., and the first address was by Dr. J. Dunn, of Barrie, Ont., the newly elected President of the Association. "Anesthetics in Practice," was the subject dealt with. His paper was a comprehensive and practical one.

Dr. R. A. McIntosh, of the Ontario Veterinary College, was the next speaker on the program, and he gave a lecture on "Retained Placenta and its Sequelae," illustrated with drawings.

The members present were entertained the rest of the evening by Dr. T. H. Ferguson, of Lake Geneva, Wis., on "Diseases of the Bovine Udder." The doctor dealt with the subject in a very comprehensive manner and also demonstrated a number of teat operations with specimens at hand.

The second day of the meeting was wholly devoted to clinics, surgical in character, and consisted of the following items:

"Demonstration of Intradermal Injections in Tuberculin Testing," by Dr. W. Moynihan.

"Choral Anesthesia and the Covered Operation for Scrotal Hernia in Pigs," by Dr. R. A. McIntosh.

"Chloroform Anesthesia in a Horse and Umbilical Hernia Operation," by Dr. W. J. R. Fowler.

"Cesarean Operation in the Cow," by Dr. T. H. Ferguson

"Cryptorchid Castration in the Horse," by Dr. D. R. Caley.

"Umbilical Hernia Operation in Pig," by Dr. T. H. Ferguson.

"Oophorectomy Operation in a Bitch," by Dr. J. A. Campbell.

Several other minor operations in horses were performed by other members of the Association.

A banquet was held in the evening as a fitting climax to the two days' activities.

R. A. McINTOSH,

Resident Sec. for Ontario.

MCLEAN COUNTY VETERINARY MEDICAL ASSOCIATION

One of the largest attended meetings of the McLean County Veterinary Medical Association was held on Sept. 3, 1924, when forty veterinarians gathered for a Swine and Small Animal Clinic, at Dr. J. G. Blum's hospital, Normal, Ill.

Dr. L. A. Merillat performed ovariectomy operations on two young sows and, assisted by Dr. W. H. Welch, reduced two difficult umbilical hernias on two other sow pigs. Dr. E. K. Glover, Kansas City, Mo., demonstrated his technic for treating roup and a method for the autopsy of a fowl; also a method of anesthetizing same.

The Ohio method of spaying a bitch was demonstrated by Dr. E. H. Marquardt, of Bloomington. Dr. J. G. Blum and Dr. W. H. Welch performed similar operations. Dr. N. L. McBride, assisted by Dr. Merillat, demonstrated the Flynn method. Twelve cockerels were caponized by Drs. N. L. McBride and C. B. White, of Stanford.

Dr. Beach, of Aulgur, demonstrated the use of chloral as an anesthetic for dogs and swine. Demonstrations with morphin and A. C. E. mixture were also made. Dr. H. B. Raffensperger gave a most interesting discussion of the toxic effect of the ascaris fluid.

A delightful social time was had at the dinner and reception to Dr. L. A. Merillat, newly-elected president of the A. V. M. A., at the Arlington Hotel, in the evening. Many came from quite a distance to witness the clinic and be present at the reception and they all declared the entire meeting one of the best they ever attended. The weather man was kind and had decreed that it "ain't goin' to rain no mo'" when the McLean County Association holds its meetings.

J. S. KOEN, *Secretary.*

NEW HAMPSHIRE AND VERMONT VETERINARY MEDICAL ASSOCIATIONS

On Sept. 6, 1924, the veterinarians of the twin states held a joint meeting on Lake Winnepesaukee. A boat was chartered and about sixty veterinarians and their wives enjoyed a trip to Bear Island, where the meeting was held.

Dr. H. W. Jakeman, of Pitman-Moore Co., gave a very interesting and enlightening talk on the diseases of poultry, this being a branch of the work which has been neglected by the profession to a great extent, until the repeated call from the poultryman has reminded us that we were the logical ones to turn to in their troubles and that we should qualify to render them a real service.

After a very satisfying luncheon was served to the hungry party, Dr. H. J. Milks, of Cornell University, gave a very instructive talk on the more common diseases of small animals which are daily met with in general practice.

Every one was so busy talking over the various problems, peculiar to the profession, that the return trip was very enjoyable in spite of the inclement weather and the rocking of the boat.

FAY F. RUSSELL, *Res. Sec. for N. H.*

SOUTHEASTERN MICHIGAN VETERINARY MEDICAL ASSOCIATION

The summer meeting of the Southeastern Michigan Veterinary Medical Association was held at Mt. Clemens, Mich., July 18, 1924. Members of the Association, with their wives, to the number of about fifty, were the guests of the Detroit Creamery Company, at Ingleside Farm.

On arrival, the guests were conducted through the spacious barns, where approximately 800 cows are on certified milk production, by Dr. L. H. Smith, veterinarian of the company. Dr. Smith showed the members quite a number of outstanding cows and bulls and gave their production and breeding records in all cases.

Our host provided a picnic supper, in the form of a box lunch, which everybody enjoyed. It was served on the beautiful lawn adjoining the farm buildings.

A short business session was held, and two interesting papers were presented. Dr. W. P. S. Hall read a paper on "Rabies," and Dr. P. V. Howard presented the subject of "Endocrinology."

H. PRESTON HOSKINS, *Secretary.*

TRYPANOSOMIASIS BOVINA IN ARGENTINA

At the Argentine Biological Society meeting, held April 3, 1924, Dr. R. L. Dios and Mr. J. A. Zuccarini reported the finding of bovine trypanosomiasis for the first time in Argentina.

Their report is published in the *Revista de la Asociacion Medica Argentina*, for June, 1924. They state that the trypanosome is a large one and resembled *Trypanosoma Theileri*, discovered by Theiler in 1902 and described by Laveran and Bruce.

N. S. M.

ARMY VETERINARY SERVICE

45TH DIVISION, OKLAHOMA NATIONAL GUARD

The 45th Division arrived at Fort Sill, Oklahoma, for two weeks' training, on August 3, 1924, with 500 horses and 5005 officers and men. The Division was complete in every detail. The day after arrival, 500 additional horses and mules were obtained from the Fort Sill garrison, and it was not very long before the Division was hard at work.

The veterinarians of the Division consisted of the following young men: Capt. W. C. McConnell, acting Division Veterinarian, Holdenville, Okla.; Capt. H. F. Ketcham, C. O. Veterinary Company, Pawhuska, Okla.; Capt. W. W. Bowman, 45th Divisional Train, Frederick, Okla.; Capt. C. C. Hisel, 70th Infantry Brigade, Enid, Okla.; Lt. C. W. Tittle, Veterinary Company, Bartlesville, Okla.; Lt. F. Y. S. Moore, 160th Field Artillery, McAlester, Okla. During the encampment, Capt. McConnell was promoted to Major and assigned as Division Veterinarian. Lts. Moore and Tittle were promoted to Captains.

All animals of the National Guard were malleined immediately upon arrival, under the supervision of Major Shand of the Regular Army, and there were none positive, and none suspicious. All were negative to the intradermic mallein test, which speaks very highly for the animals of the State of Oklahoma.

The veterinary detachments were soon functioning, and the sick stock were well looked after, and hospitalization had to be provided for twelve sick animals only, which were colic, rope-burns, nail-pricks, and kicks. This very small sick report speaks very highly for the efficiency of the veterinary detachments of the Division. Daily classes of instruction were held in the afternoons, for the veterinarians, by Major Shand. Classes for stable segeants and horseshoers were also maintained by the veterinarians of the Division.

The 45th Division is unique in the fact that it is the only National Guard organization which has a medical regiment which is complete. The regiment is under the command of Colonel Bollen, of Oklahoma City, Okla., who is naturally proud of his excellent command. The regiment is the proud possessor of one of the finest bands, of some fifty pieces, in the

state, and during the encampment it dispensed sweet music without stint. In fact, the Division has six excellent bands, which cannot be outclassed as a whole by any other National Guard division.

During the encampment, the officers and men were the recipients of many social functions. Amongst the most prominent was the dinner given to the veterinary officers of the Division by Major Shand. After the dinner, the party was entertained at the home of Dr. George Pugh, of Lawton, Okla., and the veterinarians reported as having the time of their young lives.

On the 9th, the Division was passed in review for Governor Trapp, and, considering the short time that the organization had been together, the review was very creditable. Many people witnessed this review from all parts of the state, and it did indeed take us all back to the days of 1917-18. On the 16th, the Division was again reviewed by Major General Earnest Hinds, Commanding General of the Eighth Corps Area. The General complimented Major General Markham, Division Commander, his officers, and men for the splendid showing that they had made in so short a time, and stated, should our country ever again need the services of men, he would be glad to call on the 45th Division as a whole. General Markham responded by saying that the Division was ready and willing at any time to answer its country's call on a moment's notice.

This encampment is considered the most successful one that the Division has ever had. In fact, every year shows remarkable improvement in all units, which shows cooperation and devotion to duty. The 45th Division is considered to be the most complete of all National Guard divisions, and is second to none in the United States. If this statement is doubted, write to Governor Trapp and Major General Markham, Oklahoma City, Oklahoma.

CHANGES RELATIVE TO VETERINARY OFFICERS, REGULAR ARMY

Lt. Colonel Jules H. Uri, V. C., attending veterinarian, Boston, Massachusetts, ordered to temporary duty at summer training camp, Camp Devens, Mass.

First Lieutenant Harry L. Watson, V. C., on temporary duty at summer training camp, Camp McClellan, Alabama, from duty to one month's sick leave, July 17, 1924.

Captain Clell B. Perkins, V. C., from temporary duty at the Medical Field Service School, Carlisle Barracks, Pennsylvania, to duty at permanent station, Ohio State University, Columbus, Ohio.

Captain H. S. Eakins, V. C., instructor at the Army Veterinary School, Washington, D. C., has been ordered to duty with troops at Fort Myer, Va.

Captain Geo. W. Brower, V. C., relieved from duty as assistant professor of Military Science and Tactics, Kansas State Agricultural College, Manhattan, Kansas, and directed to report to Fort D. A. Russell, Wyoming, for duty about September 1, 1924.

Captain Thomas A. Breen, V. C., relieved from duty at Fort Niagara, New York, and directed to report to Fort Sam Houston, Texas, for duty.

First Lieutenant Samuel G. Kielsmeier, V. C., Fort McPherson, Ga., on temporary duty at Fort Bragg, North Carolina.

Captain R. M. Buffington, V. C., from temporary duty at the Medical Field Service School, Carlisle Barracks, Pennsylvania, to duty at Fort Sam Houston, Texas.

Captain Gerald W. Fitzgerald, V. C., relieved from duty at Fort Bliss, Texas, and directed to report to Kansas State Agricultural College, Manhattan, Kansas, as assistant professor of Military Science and Tactics, effective September 1, 1924.

First Lieutenant James E. Noonan, V. C., Fort Benjamin Harrison, Ind., on temporary duty at summer training camp, Camp Knox, Kentucky, having accompanied the 3rd Field Artillery on march overland.

The following veterinary officers were promoted from 1st lieutenant to captain:

Effective June 23, 1924:

W. R. Wolfe, Hawaiian Department.

Effective June 28, 1924:

K. E. Buffin, Fort Meade, S. D. C. E. Cook, Fort Hoyle, Md.

Effective July 1, 1924:

H. N. Beeman, Fort Riley, Kan.	H. M. Savage, Fort Snelling, Minn.
B. C. Bridges, Fort Reno, Okla.	Mott Ramsey, Philippine Dept.
J. W. Worthington, Fort Reno, Okla.	F. C. Waters, Nogales, Ariz.
J. F. Crosby, Carlisle Barracks, Pa.	G. J. Rife, Fort Sam Houston, Tex.
R. I. Lovell, Fort Royal, Va.	O. H. Dixon, Jr., Fort D. A. Russell, Wyo.
Max Siereveld, Fort Sheridan, Ill.	I. R. Pollard, Fort Riley, Kan.
C. M. Cowherd, Fort Sam Houston, Tex.	F. H. K. Reynolds, Fort Sam Houston, Tex.
J. H. McConeghy, West Point, N. Y.	S. C. Dildine, Fort Sam Houston, Tex.
S. A. Grover, Fort Bragg, N. C.	F. B. Steinkolk, Fort Bliss, Tex.
C. S. Williams, Fort Hoyle, Md.	Homer Johnson, Fort Bliss, Tex.
F. W. Shinn, Panama Canal Zone	P. H. Riedel, Fort Bliss, Tex.
F. C. Hershberger, Fort Monroe, Va.	R. P. Kunnecke, Fort Sam Houston, Tex.
R. B. Stewart, S. G. O., Washington, D. C.	J. W. Miner, Fort McIntosh, Tex.
C. E. Pickering, Philippine Dept.	Raymond Randall, San Francisco, Cal.
S. C. Smock, Hawaiian Dept.	

Effective July 9, 1924:

Gerald W. Fitzgerald, Ft. Bliss, Tex.

Effective July 15, 1924:

C. B. Dunphy, Fort Benning, Ga.

Effective July 31, 1924:

Harry E. Van Tuyl, Fort Ringgold, Tex.

Effective August 2, 1924:

Louis L. Shook, Fort Monroe, Va.

Effective August 3, 1924:

Henry E. Hess, Fort Howard, Md.	Harry J. Juzek, Fort Des Moines, Ia.
Everett C. Conant, Fort Sill, Okla.	Wm. H. Dean, Jefferson Barracks, Mo.
Lloyd C. Ewen, Fort Myer, Va.	Solon B. Renshaw, Iowa State College
Daniel H. Mallan, Camp Knox, Ky.	Horace Z. Homer, Fort Sam Houston, Tex.
Frank H. Woodruff, Fort Hoyle, Md.	Will C. Griffin, Fort Douglas, Utah
Forest L. Hoylcross, San Francisco, G. I. D.	Charles O. Grace, Madison Barracks, N. Y.
E. M. Curley, Cornell University	V. B. Wright, Tientsin, China.
F. C. Sager, Fort Leavenworth, Kan.	Paul R. King, Fort Robinson, Neb.
L. G. Weisman, Fort Sill, Okla.	Daniel S. Robertson, Fort Bliss, Tex.
James A. McCallam, Army Vet. School.	

Effective August 4, 1924:

James R. Sperry, Fort Hamilton, N. Y.

First Lieutenant Russell S. Shannon, V. C., Fort Des Moines, Iowa, honorably discharged, August 11, 1924.

The following named veterinarians have been appointed second lieutenants in the Veterinary Corps, Regular Army, effective August 31, 1924:

Bower, Laurence O., Ithaca, New York.

Cox, Herbert M., Ithaca, New York.

Miller, William Taylor, Los Angeles, Calif.

ADDITIONAL RESERVE OFFICERS

Lieut. Colonel:

Cotton, Charles Edgecomb... 3145 Portland Ave., Minneapolis, Minn.

Majors:

Allen, James Henry... Salt Point, New York

Barstow, Ivan Lee... 1500 S. Pennsylvania St., Denver, Colo.

Boynton, Wm. Hutchins... Coll. of Agri., Univ. of California

Myers, Irvin... Portal, North Dakota

Nowell, Luster D... 318 S. 16th Ave. Humboldt, Tenn.

Porch, Jesse P... 1515 You Street N. W., Washington, D. C.

Weigen, James A... Sun Prairie, Wisconsin.

Captains:

Courtright, John M... 144 Spruce Avenue, Kansas City, Mo.

Griffin, Charles Joseph... R.F.D. No. 2, Middletown, Ohio.

Hough, Earle Mansfield... 351 Capitol Nat'l Bank, Lansing, Mich.

Kriebel, Joseph Henry... Alexis, Illinois.

Pace, John Cowden... 735 Rockwood Avenue, Calexico, Calif.

Reinhardt, Wade Hampton... R.F.D. No. 1, Stanley, N. C.

Richardson, Judge R. E... 1113 Monroe St., Wichita Falls, Tex.

Ryan, Martin A... 1703 Market Street, Oakland, Calif.

Schreck, Horst... Portland, Oregon.

Tompkins, Charles Lee... Ivanhoe, Minnesota.

Twitcheil, John Mac... P. O. Box 153, Delta, Utah.

1st Lieutenants:

Collins, Roy Lawrence... North Street, Pittsfield, Mass.

Evans, Russell C... 29-4th Street, Fond du Lac, Wisconsin.

Janke, George Charles... 419-24th Street, Milwaukee, Wisconsin.

Law, Buell Stanley... 1632 N. Austin Ave., Chicago, Ill.

Patton, John Arthur... Highlands, Kansas.

Scanlan, Wm. James... 322 Exch. Bldg., Sioux City, Iowa.

Trigg, Wm. Stark... P. O. Box 241, Manassas, Virginia.

2nd Lieutenants:

Bonnstetter, Frank A... Algona, Iowa.

Bronson, George Thomas... 1325 Cleveland, Wichita, Kansas.

Bullard, John Flower... Manhattan, Kansas.

Burger, August Fred... Winterset, Iowa.

Cheney, John Baird... R.F.D. No. 1, St. Regis Falls, N. Y.

Criswell, Edward Dixon... King City, Missouri.

Cox, Herbert Morris... Monroe, New York.

Dow, Hartwell Guy... Fort Madison, Iowa.

Foote, Howard John... 6 Pier Street, Yonkers, New York.

Fry, Charles R... Centerville, Iowa.

Jacobson, Fred Otto... Arcadia, Wisconsin.

Jones, Guy Solomon... Rockwell City, Iowa.

Lauderdale, Byron Newman... Panama City, Florida.

McCullough, Ernest Carr... Alpaugh, California.

Michum, Jonas Sidney... Kalona, Iowa.

Miller, Andrew John... West Bend, Iowa.

Parrish, Roscoe Damron... 1015 L St. Sacramento, Calif.

Richey, Alfred Newton... Ames, Iowa.

Robertson, David D... Lodi, Wisconsin.

Salley, Raymond R... Orangeburg, South Carolina.

Taylor, Theodore Fred... 140 College Avenue, Ithaca, N. Y.

COMMUNICATIONS

(Telegrams Received During the Convention)

FROM "DADDY" BLATTENBERG

Dr. H. Preston Hoskins, Sec.,
Des Moines, Iowa.

Best wishes for a wonderful meeting. Unavoidably detained but not by overwork.

Lima, Ohio,

J. H. BLATTENBERG.

August 20, 1924.

FROM PRESIDENT PEARSON

Dean C. H. Stange,
Ames, Iowa.

Please extend my greetings and good wishes to members of American Veterinary Medical Association. We are honored by their presence at our college and I hope the day will be highly profitable and enjoyable. Mother and sister join me in sending special greetings to any of Leonard's old friends, with whom he worked enthusiastically for the good of the profession.

Lake Placid, N. Y.,

R. A. PEARSON.

August 22, 1924.

FROM DOCTOR DALRYMPLE

Dr. H. Preston Hoskins, Sec.,
Des Moines, Iowa.

Greetings from largest convention much appreciated. Sorry to be absent.

Baton Rouge, La.,

W. H. DALRYMPLE.

August 22, 1924.

AN APPRECIATION

At a meeting of the Smith-Hughes teachers of Louisiana, held at the Louisiana State University recently, plans were perfected to have a picture of Dr. W. H. Dalrymple placed in each of the Smith-Hughes Schools in the State.

"This recognition is accorded Dr. Dalrymple," declared those in charge of the project, "because of the valuable work he has done for Louisiana in the field of veterinary science."

NECROLOGY

JOHN H. WEBER

Dr. John H. Weber died June 13, 1924, at Boise, Idaho. The immediate cause of his death was a severe attack of influenza.

Born in Indiana, in 1880, Dr. Weber was graduated from the Chicago Veterinary College, in 1908, and served for several years in the U. S. Bureau of Animal Industry. He later practiced his profession at Weiser, Idaho, and for a time served as State Veterinarian of Idaho (1911-1912). Since that time Dr. Weber practiced at Boise, Idaho.

Dr. Weber joined the A. V. M. A. in 1908. He was a member of the Idaho Veterinary Medical Association. Possessed of much veterinary ability, Dr. Weber was an ambitious and untiring worker in his professional life. He leaves a widow and five small children.

P. J. LYNCHKE

Dr. P. J. Lynchke died at his home, Carp, Ontario, July 20, 1924, in his 64th year. Death was due to heart failure. He was a graduate of the Ontario Veterinary College, class of 1889. He is survived by his widow and four daughters.

WALTER P. COX

Dr. Walter P. Cox died July 23, 1924, at Savannah, Ga., after a very brief illness. He was taken suddenly ill, while on official B. A. I. business, in the field, on July 22nd.

Dr. Cox was a graduate of the U. S. College of Veterinary Surgeons, class of 1907. That year he entered the employ of the U. S. Bureau of Animal Industry, at Chicago, where he was assigned to meat inspection work. He was in the field, during the foot-and-mouth disease outbreak of 1914. That year he was transferred to Baltimore, Md., where he was stationed, on the meat inspection force, until 1921. In March of that year he was transferred to tick eradication, in Georgia, in which work he was engaged when death came. Dr. Cox is survived by his widow. He joined the A. V. M. A. in 1915.

WILLIAM FRANCIS JONES

Dr. W. F. Jones, of McCook, Nebr., died at Windsor, Colo., August 23, 1924. The day previous Dr. and Mrs. Jones, accompanied by their son, Francis, left McCook for Colorado, where they planned to spend their vacation in the mountains with Dr. and Mrs. Chas. A. McKim, of Windsor, Colo. The evening of their arrival Dr. Jones suffered an attack of acute indigestion, which affected his heart, and from which he died a few hours later.

Born in Chester, Ohio, May 23, 1874, Dr. Jones received his early education in the Shandon, Ohio, schools. In 1896 he received his veterinary degree from Ohio State University. In 1900 he received the degree of Doctor of Medicine, from Miami Medical College. In 1904 Dr. Jones was stationed at McCook, in the employ of the U. S. government. Ten years ago he resigned his position and entered private practice.

Dr. Jones joined the A. V. M. A. in 1909. He was a Mason, Knight Templar and Shriner. In 1917 he was elected Mayor of McCook, in which capacity he served his city in a manner that reflected great credit upon himself. He was active in church work and was at all times closely identified with every movement for the civic betterment of the community in which he lived and was so highly respected.

ROBERT S. TODD

Dr. Robert S. Todd died suddenly at his home in New Milford, Conn., August 20, 1924, in his 58th year.

Born in Connecticut, in 1867, a descendent of Christopher Todd, the ancestry of the deceased extended back to the fourteenth century through a long line of noted clergymen and physicians. Dr. Todd was a graduate of the American Veterinary College, class of 1893. He practiced continuously at New Milford and was one of the best known veterinarians in Connecticut.

Dr. Todd joined the A. V. M. A. in 1911. He was a member of the Connecticut Veterinary Medical Association and of the Prophylactic Club of America, of which body he was president at the time of his death. He was a Mason, Knight Templar, Shriner and Odd Fellow. In 1917 Dr. Todd was a representative from his district to the General Assembly. He is survived by his widow and two daughters.

JOSEPH EDWARD STRAYER

Dr. Joseph E. Strayer, of Hartington, Nebr., died very suddenly the night of September 9, 1924. Information available indicates that he was called by a client, about 9:00 p. m., and drove out into the country to see the patient. He fell dead while attending the animal, without giving any indication that he was ill.

Dr. Strayer joined the A. V. M. A. in 1912 and attended the recent meeting in Des Moines. He was a graduate of the Kansas City Veterinary College, class of 1906, and had practiced at Hartington ever since graduation.

THOMAS F. KIGIN

Dr. Thomas F. Kigin, of Tipton, Ind., died suddenly, Sept. 11, 1924, in St. Vincent's Hospital, Indianapolis, following an operation for appendicitis performed a few days previously. Dr. Kigin suffered his first serious illness about three weeks before his death, but apparently recovered, and was at the Indiana State Fair Grounds when he was again stricken, on Sept. 4.

Born on a farm, ten miles west of Tipton, 44 years ago, Dr. Kigin received his early education in the common schools, later attending St. Joseph's Academy, at Tipton. He was graduated from the Indiana Veterinary College, in 1910, and built up a splendid practice at Tipton.

Dr. Kigin joined the A. V. M. A. in 1912. He was always active in the Indiana State Veterinary Medical Association. He was a member of the St. John's Benevolent Association, Knights of Columbus and the Elks. Dr. Kigin is survived by his widow, his mother, one sister, and five brothers, of whom one brother, Lawrence C., is a veterinarian, residing in Terre Haute, Ind.

Our sympathy goes out to Dr. and Mrs. L. E. Ragan, of Mitchellville, Iowa, in the death of their eighteen-months-old son, on September 15, 1924. Death was the result of eating bichlorid of mercury tablets.

MARRIAGES

Dr. Mack Bonifield (O. S. U. '24), of Rich Square, N. C., to Miss Opal Ware, of Warren, Ind., June 23, 1924, at Dowagiac, Mich.

Dr. L. R. Twete (O. S. U. '22), of Thief River Falls, Minn., to Miss Ruth Rustad, of Hallock, Minn., June 23, 1924.

Dr. C. A. Tratkey, of Knightstown, Ind., to Mrs. Charles F. Haugh, of Logansport, Ind., July 12, 1924, in Indianapolis.

Dr. A. M. Vining (Ont. '18), of Ayr, Ont., to Miss Nellie Kathleen Vance, of Montreal, Que., July 19, 1924, at Montreal.

Dr. Roy Patterson (Iowa '23) to Miss Eleanor Schaefer, both of Storm Lake, Iowa, August 17, 1924.

Dr. H. A. Selander (K. C. V. C. '15), of Schleswig, Iowa, to Miss Edith Jacobsen, of Denison, Iowa, August 26, 1924, at Denison.

BIRTHS

To Dr. and Mrs. H. M. Younghusband, of Toronto, Ont., a daughter, Yvonne Ellen, June 10, 1924.

To Dr. and Mrs. W. R. Kidwell, of Boise, Idaho, a son, Jack Dawson, July 23, 1924.

To Dr. and Mrs. Geo. W. Starnaman, of Berlin, Ont., a son, John Harold, August 16, 1924.

To Dr. and Mrs. H. C. Fitch, of Missouri Valley, Iowa, a daughter, La Voune June, August 19, 1924.

PERSONALS

Dr. J. J. Minnaugh (U. P. '23) is now located at Litchfield, Conn.

Dr. J. E. Bennett (Ont. '14) has been transferred from Calgary, Alta., to Winnipeg, Man.

Dr. H. H. Prestel (Chi. '10), formerly at Emmett, Idaho, is now located at McCall, Idaho.

Dr. W. G. Irvin (Cin. '15), formerly at Carlisle, Ky., is now located at Ashland, same state.

Dr. H. S. Wooters (Chi. '13) is in charge of the Jensen-Salsbery Shipping Depot, at Peoria, Ill.

Dr. C. R. Mather (McK. '13), formerly at Battle Ground, Ind., is now at 801 Brown St., Lafayette, Ind.

Dr. J. Gordon Anderson (Ont. '24) has left Tracy, Minn., and is now located at Shepard, Alta., Can.

Dr. Wm. H. Simmons (Ont. '92), State Veterinarian of Kentucky, was a recent visitor to Champaign, Ill.

Dr. W. E. Wight (Ont. '83), of Pittsburgh, Pa., will be located at Fort Logan, Colo., for an indefinite period.

Dr. C. H. Cleland (Chi. '15) has left Lake Geneva, Wis., and is now located at 117 No. Franklin St., Janesville, Wis.

Dr. John P. Turner (U. P. '90) has notified us of his new address: 1357 Kennedy St., N. W., Washington, D. C.

Dr. R. W. Bowerman (K. C. V. C. '11) is back at Hennessey, Okla., after a stay of several months in Oklahoma City.

Dr. N. D. Christie (Ont. '10), formerly of Calgary, Alberta, gives his new location as 711 Boyd Bldg., Winnipeg, Manitoba.

Dr. Robert Conover (Chi. '20), who has been engaged in practice in Lima, Ohio, for nearly four years, has located in Wauseon, Ohio.

Dr. W. T. Scarborough (K. C. V. C. '17), of Raleigh, N. C., is Secretary-Treasurer of the Central Carolina Field and Kennel Club, Inc.

Dr. Senator Phillips (K. C. V. C. '12), of David City, Nebr., with his family, recently visited relatives in the vicinity of Peru, Ind.

Dr. Herbert Marshall (Ohio '93), of Ivy Depot, Va., is still abroad. He gives his address as Grafton House, Kew Gardens, Surrey, England.

Dr. W. A. Troutman (Ont. '14) has changed locations. He was formerly at Port Trevorton, Pa., and is now located at Elizabethville, same state.

Dr. Ward Giltner (Corn '06), of East Lansing, Mich., was the principal speaker at a noonday luncheon of the Lansing (Michigan) Kiwanis Club, recently.

Dr. F. T. Daubigny (Laval '89), Director of the School of Veterinary Medicine, of the University of Montreal, is planning a trip to France and England.

Dr. A. T. McIntyre (Ont. '12), of Brown City, Mich., underwent an operation for gall-stones on August 18, and at last reports was making a nice recovery.

Dr. E. M. Alderman (K. C. V. C. '14), who has been located at Fayette, Miss., for some time, is now at the Agricultural and Mechanical College of Mississippi.

Dr. E. B. Parker (K. C. V. C. '08), of Newton, Ill., recently received the appointment of County Veterinarian by the Board of Supervisors, of Hancock County, Ill.

Dr. Simeon Yetter (U. P. '13), of East Downingtown, Pa., has been in poor health for several months, but a recent letter indicates that he is on the road to recovery.

Dr. D. E. Westmoreland (Ind. '04), of Owensboro, Ky., recently demonstrated the technic of vaccinating a dog against rabies, at a luncheon of the Owensboro Lions Club.

Dr. E. V. Alexander (Ind. '07), of Indianapolis, Ind., has been appointed Director of Tuberculin Testing, in Marion County, Ind., at a salary of \$3200 per year, effective Oct. 1.

Dr. W. R. Barnard (K. C. V. C. '09), of Belleville, Kan., is Secretary of the North Central Kansas Free Fair, held at Belleville, "Crossroads of America," Sept. 2-3-4-5, 1924.

Dr. C. M. Merriman (Chi. '16), of Mt. Pulaski, Ill., enthusiastically writes: "Believe me, I certainly realize what good the A. V. M. A. does for the veterinarian, and I am for it."

Dr. Maynard S. Nighbert (Ont. '06), of Pittsfield, Ill., has been appointed Assistant State Veterinarian, a position held by his father, the late Dr. J. D. Nighbert, for thirty-five years.

Dr. A. J. Savage (K. C. V. C. '09), of Colorado Springs, Colo., visited old friends in Manchester, Iowa, on his way home from the meeting in Des Moines, the latter part of August.

Dr. Benj. McInnes (R. C. V. S.) and his son, Dr. B. Kater McInnes (U. P. '11), of Charleston, S. C., recently vaccinated about 2000 dogs against rabies for the city and county of Charleston.

Dr. E. Brainerd (Chi. '10) is back in Memphis, Mo., after spending several months in Colorado Springs, Colo., where he went with Mrs. Brainerd, who has been in poor health for some time.

Dr. L. R. Twete (O. S. U. '22), who is both practitioner and City Dairy Inspector of Thief River Falls, Minn., received the degree of Pharmaceutical Chemist from Ohio State University in June.

Dr. S. W. Haigler (McK. '19), who has been associated with Dr. J. C. Flynn, of Kansas City, Mo., for some time, has located in St. Louis and opened a small animal hospital at 6624 Delmar Blvd.

Dr. Charles A. Lueder (Corn. '03) has been appointed coach of the Cornell varsity and freshman crews. Dr. Lueder will be head coach, succeeding John Hoyle, who again becomes boat-builder for the Cornell navy.

Dr. H. J. Frederick (Iowa '05), Professor of Veterinary Science at the Utah Agricultural College, is on leave of absence for one year. He will travel in Europe and will visit most of the veterinary schools in England and on the Continent.

Dr. Wm. Jopling (Amer. '87), formerly of Owosso, Mich., who spent the greater part of the present year in Los Angeles, Calif., has returned to Michigan and located at Kalamazoo, where he is associated in practice with Dr. O. Glenn Davidson (Ont. '07).

Dr. J. L. Faragher (Ont. '01) is city food inspector of Lorain, Ohio, which was the center of the terrible storm, June 28. Dr. Faragher recently wrote that he did not suffer much loss as a result of the storm, but would be unable to attend the meeting in Des Moines.

Dr. Emil Krenek (K. C. V. C. '16), who has been fighting foot-and-mouth disease at various points in California, writes rather significantly: "I have been receiving the JOURNAL regularly wherever I happened to be stationed, at various places, since coming to California."

Dr. W. A. Young (N. Y.-Amer. '00), of Boonville, N. Y., was elected President of the New York State Fox Breeders' Association, in August. Dr. Young also acted as Superintendent of the Fox Show held in conjunction with the New York State Fair, at Syracuse, in September.

Dr. J. D. Pottie, M. R. C. V. S., of the firm of J. D. Pottie & Son, of Greenock, Scotland, was a recent visitor to Detroit. While in the Motor City, Dr. Pottie was the guest of Parke, Davis & Company. He was en route to Chicago, to visit the stock-yards, and thence to Washington, D. C., for an official call upon Dr. John R. Mohler, Chief of the B. A. I.

